"COMING DOWN TO E.A.R.T.H."

LA ESCUELA DE AGRICULTURA DE LA REGION TROPICAL HUMEDA
E.A.R.T.H.

A STRATEGIC EVALUATION

Produced for:
USAID/Costa Rica

Produced by:
Richard Bawden, University of Western Sydney, AED consultant
John Rigby, Management Systems International
Roberta Warren, Management Systems International

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"Then said a teacher, speak to us of teaching.
And he said:
No man can reveal to you aught but that which already lies half
asleep in the dawning of your knowledge.

The teacher who walks in the shadow of the temple,
among his followers, gives not of his wisdom but rather of his
faith and his lovingness.

If he is indeed wise he does not bid you enter the house of his
wisdom, but rather leads you to the threshold of your own mind."

The Prophet
Khalil Gibran

TABLE OF CONTENTS

Appendices

Glossary

1. EXECUTIVE SUMMARY

A mid-term evaluation of "La Escuela de Agricultura de la Region Tropical Humeda" (E.A.R.T.H) was conducted by an international, three-person team, in July 1991. The methodology used for the evaluation was consistent with the academic ethos of this innovative institution in being both participative and systemic. The key metaphor adopted for the review was the university as a **CRITICAL LEARNING SYSTEM.**

With the institution being only its second year of operation, the approach was based on a **STRATEGIC LOGIC** which reflected the following primary questions:

- What is the fundamental **PURPOSE** of E.A.R.T.H. as seen by those who influence its development and by those who will be affected by its activities, and in what context is that purpose set? (What type of organization - or critical learning system - is E.A.R.T.H. trying to become? Is it intending to extend its role beyond being a teaching institution? What difference is it trying to make to the complex issues of agriculture and natural resource management of the humid tropics?)

- What organizational **PROCESSES** has E.A.R.T.H. got in place, to assist it in its basic quest and how is their effectiveness being perceived by the E.A.R.T.H. community? (How do the people at E.A.R.T.H. see themselves carrying out their basic functions relative to the purposes they are pursuing? And what processes of strategic review do they practice to ensure the continuing relevance of what they do, as well as any mooted expansions of purpose?)

- What is E.A.R.T.H. doing to assure that it is able to afford to do what it wants to do? (How is the **SUSTAINABILITY** of the organization being assured?)

The process of the review involved extensive "critical conversations" with a wide spectrum of people associated with E.A.R.T.H., and in particular with the E.A.R.T.H. community itself, as well as "critical appraisals" of extensive documentations.

From such sources, the team has concluded that, after a puzzlingly long gestation period, the progress of the development of E.A.R.T.H. since the laying of the foundation stone in April, 1989 has been quite outstanding, by any measure of comparison.

The review also revealed the university to be in a vitally important phase of transition; one where the locus of control is shifting from groups of people who are essentially outside the institution to those that now comprise the institution itself.

The articulation of the concept and its early interpretations into plans, the establishment of the early policies and functions, and the appointment of the foundational staff, represent the first phase of the university's development. The second phase began essentially once the first classes began.

This study then has been conducted at a moment when this transition in control is in full swing. It has revealed that, as is usually the case at this juncture in any organization's evolution, it is a time of some confusion and stress at E.A.R.T.H. for all parties concerned. At the centre of things is a level of significant uncertainty about the central PURPOSE of the institution as well as about some of the PROCESSES that are being used as the institution "learns how to go about its business".

The purpose and functions that have been adopted as crucial to the establishmant and management of the university, have been in the main, generated extrinsically. The next stage in the evolution of E.A.R.T.H. will see new policies and procedures develop through a process of those who now constitute the university, "learning their way through" the new situations that they will continue to face in an ever changing environment to which the organization must strategically adjust.

Through their participation in the evaluation process, faculty, administrators and students recognized the importance of the lack of clarity in the current strategic direction of the university and some conflicts of interpretation in the educational paradigm were apparent.

A number of academic, social, financial, organizational and personal issues which might potentially affect the future well-being of the E.A.R.T.H. enterprise, were revealed. These were conceptualized both as "forces within the learning system" as well as those "without, in the environment of the system". In this manner, the strengths and weaknesses of the system were "self-identified", as were the opportunities and threats posed by the environment.

It was recognized that while the university has made enviable progress in establishing itself as a critical teaching system providing an education relevant to the management of natural resources for responsible farming in the humid tropics -- in attracting quality faculty, administrators and students, in adopting a curriculum based on principles of *aprender haciendo*, in providing most resources of more than adequate standard, and in arranging for its own continuing financial viability -- the need is now recognized for a number of major strategic issues to be addressed and internal adjustments made.

- The extent to which the teaching focus should be extended to embrace other functions directed at the design and management of novel farming systems for the humid tropics.

- The way by which the development of a PARADIGM appropriate to the complex challenge of responsible forms of farming appropriate to the humid tropics of the Americas, is to be achieved by the faculty, or at least by other scientists either located at E.A.R.T.H., or working in extremely close contact with the faculty and students there.

- The manner by which competencies appropriate to these complex perspectives and

activities in farming systems or agroecosystem research and development, or natural resource management, are adopted by the faculty as their own unique and ethical PRAXIS. And the reflection of this in the consistent manner by which the university's own natural resources are developed, exploited and managed with particular reference to the commercial farming enterprise and the rain forest (for ecotourism).

- The interpretation and translation of these novel concepts and actions into innovative, theoretically sound, and ethically defensible educational strategies by the faculty in ways which will facilitate the development of similar competencies (praxis) by students. The identification and self-development of educational competencies of "learning facilitation", by the faculty, which together will represent the participative educational paradigm of E.A.R.T.H..

- The assurance of the long term financial viability of the university recognizing that it will be a function not just of the management of financial resources, but also of the institution's ability to manage risk, as measures of its effectiveness and relevance as an organization warranting future support. It is also recognized that while the capital resources that E.A.R.T.H. has received from USAID and the Government of Costa Rica will be significant elements of its future viability, they will not, in and of themselves, guarantee the university's future.

- A number of very difficult, almost paradoxical, issues are inherent here. In the very first place, faculty have to be committed to a quest which is as perpetual as it is complex. It is a sufficiently difficult task to work in farming systems, or agro-ecosystems research and development, or natural resource management, let alone develop educational strategies which will allow students to develop similar competencies. There are few locations in the world where academics may study how to develop such a praxis.

- It was agreed that faculty must find quality time to pursue the difficult concepts and develop the systemic practices which are inherent in their newly focussed purpose, (whichever one they select) just as they will need to have access to resources to allow them to readily communicate with other academics around the world who are involved in similar quests.

- Within the E.A.R.T.H. community they must continue to frequently meet together to discuss developments in **paradigm** and **praxis** and must be encouraged in this perpetual and complex task, by effective **leadership** as well as by both extrinsic and intrinsic incentives.

The Evaluation Team believes that the methodology that was used, and that is described in

3

some detail within this report, could be a useful process for the E.A.R.T.H. community to follow as they continue to "learn their way through" the unknown and complex domain that they have chosen to pioneer. In this manner they will be modelling the very attributes that they regard as vital to their participative and integrated approach to an education which is relevant to the responsible development of the humid tropics; an approach that must include learning new ways to learn.

2. PREFACE AND ACKNOWLEDGEMENTS

Over recent years, a number of critical studies have been conducted on the strategic role and performance of agricultural universities in the development of nations. One of the most significant of these was conducted by the Bureau for Program and Policy Coordination's Center for Development Information and Evaluation (CDIE) of USAID. This involved 23 colleges and universities in 10 countries (Hansen, 1990).

The present study, of the Escuela de Agricultura de la Region Tropical Humeda (E.A.R.T.H.) in Costa Rica, owes much to the lessons learnt during the conduct of the above -- especially with regard to the STRATEGIC context and philosophy underlying the approach taken, as well as to the participative and systemic methodology adopted.

Studies of this type are always somewhat daunting and without the cooperation of key people, would be virtually without value. Yet key people are, by nature, extremely busy as they involve themselves in the continuing processes of organizational development. This is especially so when the institution is still in its very early formative stages; when long term strategies and day-by-day operations are being conducted concurrently. It is therefore with a particular gratitude that this Evaluation Team acknowledges the outstanding level of collaboration that staff and students of E.A.R.T.H. alike provided during the far too brief period of the study.

In presenting this report, the team hopes that it has adequately captured the essence of the university as well as the issues which are at the center of its continuing successful development. We assume total responsibility for all that is recorded here and offer complete absolution to all of those who cooperated with us with respect to any of the findings or opinions recorded in the text.

We are particularly conscious of the fact that the report will need to serve two purposes: In the first place it will need to provide a review and summarize the process and progress of the project *to date* to establish a university for the humid tropics in Costa Rica.

In the second place, it must satisfy the strategic needs of those concerned with the *future developments* that now need to occur at the institution itself.

This presents a difficult challenge as it exposes two quite different approaches to the notion

of evaluation: (a) an ex post facto account of the outcomes of the planning processes as they are now recognized by the norms, policies and practices of the institution as it currently "behaves", and (b) a statement in critical reflection, which provides the stimulus for the new practices now necessary for the institution itself to take appropriate strategic actions in developing its own future.

It would be a grave error of omission, if we did not acknowledge from the outset, the almost unbelievable level of commitment to the enterprise that we encountered from all directly concerned with the development of E.A.R.T.H.. In this regard we would like to pay our particular compliments to the Director General, Dr. Jose Zaglul. He gave unstintingly of both his time and his support and without his generous accounts of his visions, plans and experiences this would have been much the poorer exercise.

The team appreciated greatly the time given to it by the three members of the Board of Directors to whom they spoke and who provided a rich overview of the history and context of E.A.R.T.H. - Don Rudolfo Cortes, Don Jorge Manuel Dengo and Don Hernan Fonseca. The contributions from Lic. Manuel Peralta with particular regard to the financial state and affairs of the university were of outstanding value to the team.

Others at E.A.R.T.H. who particularly gave liberally of their time and of their insights and wisdom, were Dr. Carlos Burgos, Mr. Dan Sherrard, and Sr. Alex Mata, whilst the logistics support from Marta Escoto was exceptional.

At the A.I.D. mission, the support accorded by Mr. William Baucom and Mr. David Fledderjohn is acknowledged with extreme gratitude.

Finally, the assistance of the Academy for Educational Development and Management Systems International is gratefully acknowledged and in particular, the logistics support provided by Beverly Jones and Joan Favor.

3. NOTES ON THE METHODOLOGY

As the methodology used in this evaluation is central to the whole essence of the outcomes, it is presented in considerable detail (Refer to Section 5 and Appendix 2). In the ideal situation, the process would have been a much more participative one than circumstances presently allowed; in the event, the teaching schedules of the E.A.R.T.H. faculty were so intense that they prohibited the four or five day workshop that would normally be conducted as a vital aspect of this methodology. For this reason, the report is somewhat more detailed in the description of the methodology than would normally be anticipated.

The word *methodology* is used here advisedly: The way the evaluation was conducted represented much more than a mere collection of techniques and methods. As the whole

process is underpinned by a set of theories and philosophies whose nature was made explicit at every opportunity, the evaluators were able to exhibit the nature of their professional **praxis** - the way they went about their business of trying to make sense out of a complex and unfamiliar set of issues through the conduct of **critical conversations.**

The major device of analysis used in this report is that of the **COMMUNICATIVE ACTION**: In essence, the process involves sets of **critical conversations** between the evaluators-as-facilitators and those involved in the situations being evaluated. The conversations are envisioned as a form of collaborative learning - communicative action - which has the intent of exposing new insights and understandings about situations in such a manner that they will result in a motivation, by those directly affected by those particular situations, to improve them.

The experiential flavour of these conversations can be gathered from the illustrative quotations presented in Appendix 1.

As the conceptual framework of this methodology is key to a full understanding of the significance of both the process and its outcomes, it is outlined in some detail in Appendix 2.

3.1   Objectives

The original objectives of the work were presented as:

1. Review and summarize the process and progress of project implementation with particular emphasis on compliance with the planning guidelines and parameters established in the project documentation.

2. Assess the current financial situation of E.A.R.T.H. and determine the conditions under which the College may reach long-term financial viability.

3. Measure the progress E.A.R.T.H. has made to date in a) establishing an effective system of organization and operations; b) defining workable and appropriate norms and policies; and c) implementing and developing an academic program consistent with the goals and philosophy of the project.

3.2   Scope of Work

The three areas of inquiry outlined in the original Scope of Work were as follows:

A.   Measurable Indicators of Project Implementation

- Key events in the implementation sequence
- Economic and financial aspects
- The educational program

B.   Long Term Financial Viability

C.   Effectiveness of the Organization and Programs

- Structure and effectiveness of the organization
- Policies, norms and practices
- The academic program
- Other issues

In the context of a **STRATEGIC EVALUATION** this becomes a framework for conversations, rather than a prescriptive guide for analysis. However, while a strategic evaluation focusses on the future, the events of the past and of the present represent important contexts. This report provides an overview of both as a context for the strategic focus. The integration of all of these aspects is vitally important if the report is to "hang together" and avoid being essentially two totally different sub-reports.

Whether it is the history of the organization, aspects of its present effectiveness or its future opportunities, the comments that are recorded here are taken from records of actual conversations with the people who were interviewed, or from reports provided to the team.

A number of terms and expressions used in this report have particular meanings which are crucial to understanding the process and outcomes of the evaluation. A GLOSSARY is provided at the end of the report.

3.3   The Constituency for the Critical Conversations

The evaluation team engaged in a long series of critical conversations across a wide spectrum of people associated with E.A.R.T.H.. The full list of those interviewed appears in Appendix 3.

In brief, the constituencies covered included:

> The Boards of Directors and Trustees
> The senior administrators of the university
> The faculty
> The students
> The commercial farm management
> USAID/Costa Rica personnel
> Senior administrators and faculty of other Costa Rican universities
> Directors of the National Research Council

4.   INTRODUCTION

While an *ex post facto* approach was not adopted as the major focus for this evaluation due to the importance of a *strategic emphasis*, it was agreed that an assessment of process and progress of the implementation of the project would provide an extremely valuable context for those reading the report. This aspect is presented here in two ways, reflecting the passive accounts gathered from the documentation as augmented by extracts from the many conversations held around these and other topics during the course of the inquiry.

4.1   The Context of E.A.R.T.H.

The problems of the humid tropics of the Americas are as pressing as they are complex (Appendix 4). A human population increasing at an almost exponential rate, is presenting a potentially devastating force to a fragile environment. The challenge is to learn how these forces are to be met in ways which will allow millions of people to live in sustainable relationships with the land, without the wholesale destruction of the natural resource base, or the degradation of individuals, communities and indeed cultures.

4.2   Process and Progress of Project Implementation

Whilst E.A.R.T.H. only enrolled its first students in 1990, the idea of an independent university specializing in applied agricultural studies of the humid tropics had a long period of gestation.

4.2.1 Concept

The idea of a higher education agricultural school for the humid tropics in Central America emerged slowly over a twenty year period in various forms. Consideration was originally given to utilizing either CATIE or the University of Costa Rica. For reasons having much to do with the large bureaucracies of both state universities and the OAS of which CATIE is a part however, the idea of a separate university seemed to be more feasible. An A.I.D.

Mission Director (Daniel Chaij), a U.S. Ambassador, (Curtin Winsor), Don Rodolfo Cortes, and Don Jorge Manuel Dengo eventually were all interested in this idea at the same time in the same country. Additional interest and support came as a result of a visit to Costa Rica by Norman Brown of the Kellog Foundation.

USAID funded preliminary feasibility studies in 1983 and in 1984, the Kellogg Foundation funded a Task Force for a project feasibility study. In presenting its recommendations in November 1984, that Task Force (Dr. Glenn Taggart, USA, Sr. Eduardo King Carr, Brazil and Dr. Luis Carlos Gonzalez, Costa Rica) advised that "the objective of the college therefore will be to develop appropriate cultivation and management techniques for the lowland humid tropics and to train the human resource base to develop and extend this knowledge".

It was also this group that introduced the notion of "learning by doing" - *aprender haciendo.*

In September 1985, following a successful presentation by this Task Force to the Board for International Food and Agricultural Development (BIFAD), USAID entered into a grant agreement with the Government of Costa Rica in the amount of $7.0 million to establish a regional agricultural university for the humid tropical region of Central America.

4.2.2 Realization

This period of time was one of great political conflict in Central America and passage of the bill to create the school was difficult. There were, for example, public demonstrations expressing fear that the U.S. funding would be used to develop a military base for those wishing to overthrow the Nicaraguan government rather than a school of agriculture for the humid tropics. Debate went on for about two years with many changes to the original bill and finally on September 9, 1986, the Escuela de Agricultura de la Region Tropical Humeda (E.A.R.T.H.) was established as a privately endowed international institution by the passage of Law Number 7044, published in La Gaceta on October 22, 1986.

The Escuela de Agricultura de la Region Tropical Humeda (E.A.R.T.H.) was established by an Act of Congress (7044) of the Government of Costa Rica in 1986, with the following objectives:

(a) To establish centers for the teaching, research and extension of knowledge about agriculture and conservation of the humid tropics.

(b) To contribute to the socio-economic development of Costa Rica and other countries of the area, through the development of technologists competent in the fields of the cultivation, harvesting and processing of agricultural products in the humid tropics.

(c) To carry out research and extension related to the humid tropics and its ecological protection.

9

(d) To teach and prepare technologists for agroindustries in the humid tropics.

(e) To offer Bachelor level education in Agriculture with a special emphasis on the humid tropics.

(f) To carry out programs of cultural extension.

(g) To venture into other activities related to the specialization.

This was to be an innovative university given both the context in which it was to be set - the rapidly deteriorating natural resource base of the humid tropics of Central America - and the participative educational philosophy that it was to espouse - "aprender haciendo" or learning by doing. ·

Between November 1986 and June 1988, and under a Phase 1 contract, California Polytechnic State University (Cal Poly), the University of Nebraska, and Rutgers University, the state university of New Jersey, helped to establish and develop E.A.R.T.H.. This assistance included assessments and planning advice for the four year curriculum, student and faculty recruitment, administration policies, personnel recruitment, and effective use of the physical resources including the general plan and design of the university's campus, its commercial farm, and its financial control systems.

The current **STATEMENT OF WORK**, some 66 tasks, for the associated universities is outlined in Appendix 5.

In May 1987, the Government of Costa Rica transferred and assigned to E.A.R.T.H., the rights and responsibilities to implement the project described in the grant agreement of September 1985.

The first people involved were Don Jorge Manuel Dengo, acting Director; Larry Rathbun, Cal Poly Chief of Party; Heriberto Rodriguez, A.I.D. engineer; and Jorge Sauma, Project Manager for the San Jose E.A.R.T.H. office. Land was purchased near Pocora, construction bids were let and E.A.R.T.H. hired their own engineer, Carlos Hernandez.

The cornerstone was laid and the first E.A.R.T.H. Director General, Dr. Jose Zaglul, was hired in April, 1989. Eleven months later classes began.

In August 1989, the United States Agency for International Development (USAID) entered into a cooperative agreement with E.A.R.T.H. with an obligated pledge of $11.2 million. In the support papers accompanying this agreement, the objective of the project was stated as strengthening "the technical quality of the human resource base working in agriculture, particularly in the lowland humid tropics" (Cooperative Agreement, 1989). The aim was foreseen as "developing professionals capable of working immediately in the private and public sectors at all levels of agriculture, from the production of seed, food production,

marketing, storage, processing, export and credit, as well as creating an expanded pool from which individuals can be selected for further study at the graduate level which is important to continued development and adaptation of technologies for increasing productivity."

All of this was set within the overall context of producing "a professional human resource base with practical and educational experience needed to address the agricultural production problems of the Central America and Panama (CA/P) region."

In June 1990, California Polytechnic State University (Cal Poly) in consortium with Rutgers and Nebraska, was successful in bidding for a Phase 2 contract.

4.2.3 A Brief Synopsis of the Present Status

Along this developmental sequence, the central focus of the institution settled on education as the primary task, and on learning-by-doing as the guiding ethos.

E.A.R.T.H. enrolled its first 60 students in March 1990. They came from 8 countries in Central America, South America and the Caribbean: All are countries with substantial areas of humid tropics. E.A.R.T.H. is now into the second trimester of its second year. There are 55 students in their second year and 50 in their first, from 10 different humid-tropic countries. There are 17 professors including a librarian and a computer specialist, and they represent nine different nationalities including Cameroon and Nepal. There is a total of 71 staff including the faculty.

E.A.R.T.H. emcompasses approximately 3,300 hectares. In addition to an academic farm, there is a commercial farm to produce income for the school. This commercial farm currently includes a major banana operation of 303 hectares, a cattle enterprise of 2,000 hectares. Pepper, casava, and other root crops are produced. There is also a 300 hectare forest reserve.

There is an endowment managed by a Board of Trustees and a Board of Directors to provide policy guidance. These Boards meet twice a year.

The construction continues to be virtually on schedule with only a two month delay projected over the entire construction period of four years. There have been no construction overruns. Of the major buildings yet to be completed, the library remains the one key element of the university which is missing at the time of this evaluation.

4.3   Critical Commentary of the Present Status of E.A.R.T.H.

The most relevant statements about the present status of E.A.R.T.H. as a university for the humid tropics of the Americas, are best captured by the perceptions of those most closely associated with the development and management of the institution. It is consistent with the recognition that successful organizations are those which accept the early responsibility for

11

planning their own futures and which learn through the process of carrying out such self-generated plans. They learn their own way into their own futures. The evaluation team carefully structured the data-gathering process to elucidate the strengths and weaknesses of this new organization.

The E.A.R.T.H. faculty and administration recognize that they face a number of very significant challenges, for which they must now accept self responsibility. As revealed by the process of critical conversations, those who comprise E.A.R.T.H. now recognize that it must at least:

- more closely refine its basic purpose (mission) in operational as well as strategic terms.

How does E.A.R.T.H. work out the design and development of improved farming systems for the humid tropics of the Americas?

How does it best help others (through both formal and continuing education programs) learn how to do the same?

The need is to develop internal task forces to address these issues in terms of

a. the formulation of an approach to farming systems design and development acceptable by the E.A.R.T.H. faculty.

b. conceptually sound and feasible educational process which the faculty believes in, understands, and is committed to in the context of participative learning for complex situations.

If E.A.R.T.H. owns the above issues, then they will accept responsibility for doing something about them. Indeed, it is only if such responsibility is accepted that E.A.R.T.H. will do anything to resolve them.

The following review is based on the critical conversations recorded through interview and later organized into the themes representing the major areas of the STATEMENT OF WORK of the assisting universities as these were considered to be a most appropriate list of functions. They also represent an expansion of the three areas of inquiry stated in the SCOPE OF WORK for this evaluation.

4.3.1 Organization of the University

It was generally felt that the organization of the University had been adequate and appropriate to the state of development to date. The notion of separating the roles of the Board of Directors and Board of Trustees, was regarded almost as a masterstroke as it was recognized that these were indeed two quite different, if interdependent functions. The

interrelationships between the Boards and the Administration of the University, and those between both of these domains with USAID and the Kellogg Foundation, were all regarded as being grounded in "goodwill" and as a result, were all regarded as working as effectively as they could.

The intention of the meetings of the Board of Directors to be held on campus, was well received.

The frequent meetings of the faculty -- as the academic corps of the university -- with the senior administrators, and particularly with the Director General and Academic Director, were regarded most positively, although there were some comments about the lack of focus for some of these meetings. The involvement of faculty in the recent review of curriculum was universally quoted as an example of the type of interrelationship that all aspired to. The sense of transition in terms of an increasing autonomy within the institution itself, was keenly felt, although there was some concern that the Directors were still too involved in the details of management rather than now confining their activities to issues of policy. In thinking about this process, many of the faculty recognized that a sense of empowerment could be an illusion if the members of the Board were able to over-rule their decisions. The importance of this issue, then, is the "recognition by the faculty that the new relationships between them and the Board(s) would need to be developed. It was also recognized that the Director General and the Academic Director would be key to facilitating the negotiations around the re-definition of roles. There is a need for faculty, administration, and boards to be conscious of the need for, and committed to, actions for change as the situation changes.

The difficulty the team encountered in actually getting together with all of the faculty at once suggests that some re-prioritizing of tasks will be necesary if task forces and sub-committees are to be established. The essence of progress in this regard is increasing autonomy for the organization, the faculty, and the students alike. For the organization to be more autonomous, the faculty must be freed up from their very heavy teaching loads, to enable them to participate in dealing with the key domains of concern that they have identified. They must also be given a sense of ownership in dealing with these issues their way, whilst being charged with the responsibility for being rigorously methodological in their approach.

E.A.R.T.H. needs to begin to build linkages of interpendency to replace the dependent links thus far established with USAID, Cal Poly and Kellogg Foundation. How can E.A.R.T.H. faculty and administrators work in ways with representatives of these institutions (and in particular with their own two Boards) which reflect their ever-increasing autonomy? The need seems to be to establish representative groups (subcommittees) which combine faculty and administrators with Board members and other external advisors (USAID, Cal Poly and Kellogg) and which are clearly under the control of E.A.R.T.H. itself, which:

a.   address all of the functions which are currently planned and carried out by people other than direct E.A.R.T.H. personnel; and

13

b.   connect E.A.R.T.H. interdependently with the emerging international network of rural universities and colleges of Agriculture who are recognising the need for self-generated new directions: examples include Hassan II in Morrocco, Kasetsart in Thailand, UPLB in the Philippines, Tamil Nadu and others in India, Michigan State and other in the USA, Guelph in Canada, Hawkesbury in Australia. Optimally, the E.A.R.T.H. faculty and students would be able to attend international meetings and to participate in teacher/student exchange programs.

It is necessary for E.A.R.T.H. to address urgently the nature of the relationships developing between the student body, faculty, and administrators. How can everyone, in the exciting E.A.R.T.H. enterprise, be sufficiently empowered to allow effective collaboration across the whole community? There is a need to develop more effective relationships between the decision-making bodies at E.A.R.T.H. and the student body (with particular regard to the student government) to address:

a.   issues of farming systems paradigm, of curriculum, and of educational enviroment; and

b.   continue to address the financial well-being of the institution and have the financial situation owned by all of those at E.A.R.T.H.

Perhaps the area of most potential concern, was the isolation from the decision making processes of the organization, that many students felt. Although there is a Student Government, the members of this felt that many of its genuine concerns about facilities and conditions, were not being heard.

4.3.2 Academic Program

As mentioned above, the development and management of the formal academic program has been adopted as the primary task of the institution to this point.

4.3.2.1 Student Recruitment

The recruitment of students with a suitable balance between appropriate academic backgrounds and personal dispositions relevant to the purposes of the institution, was regarded as one of the greatest challenges facing the university. This was particularly compounded by the geographical spread of the constituencies of the countries of the Americas, and the low socio-economic status of many of those deemed to be "ideal candidates". Some concern was already being expressed about the distinctions between students with different backgrounds. Ensuring that a mix of scholarship students and self-paying students serve on committees to address policies and problems will help foster better understanding. It is ultimately in E.A.R.T.H.'s best interest to create a constituency of students from all socio-economic groups. While a deep commitment to recruitment was held across the whole organization, it was also recognized as a time consuming and increasingly energy demanding activity.

The need to extend the message of E.A.R.T.H. was universally recognized. In this connection, like in so many others, the parallel was frequently drawn with the achievements of Zamorano.

4.3.2.2 Faculty Recruitment

There was almost an element of surprise amongst all concerned, that faculty with the academic qualifications and dispositions appropriate to involvement in this "brave new venture" in education for the humid tropics, had already been recruited in sufficient numbers to mount the first two years of the academic program.

Recruitment is one thing however, while performance and personal satisfaction with terms and conditions are another. A number of key issues were raised by faculty and support staff alike, about the isolation of the campus and the hours of face to face commitment. The evaluators felt that some classes of the same course could be combined to form larger lecture classes with no loss in quality. This would create more faculty time for curriculum planning and student interaction. The implications of the isolated campus for wives and family were often stressed. A docents' program could be developed utilizing spouses of the faculty to relieve the faculty of the time-consuming work of handling the increasingly large visitor population.

Issues of future roles as researchers and extension (continuing education) professionals were on the agenda of many faculty, and this was reflected in some concerns about personal development strategies and promotional prospects.

There seem to be sufficient faculty concerns that any long-term plan might well consider the appointment of a dean of faculty to address curriculum needs and faculty teaching schedules.

15

4.3.2.3 Scholarships and Financial Aid Plan

It was well recognized that the availability of scholarships represented a key issue to the sustainability of the university in both the senses of attracting students by providing financial support for them, and affording to do so.

Many students were concerned that even with scholarships they were unable to support themselves adequately, and they expressed the hope that the scholarships might be extended or opportunities for "earning while learning" provided. The issue of availability of student loans was also raised.

It is an excellent indication for so new an organization that the faculty took a collection to provide Christmas transportation for some of the students. Future plans, however, should address the underfunding of scholarships. Possibilities include loans, enhanced "earning while learning" programs, and additional donor funding of scholarship students. In particular, AID's large Latin American and the Caribbean scholarship programs should be notified of E.A.R.T.H.'s innovative programming. Perhaps most important is the need for the staff in charge of fundraising to be aggressive and to cast more broadly amongst the donors for assistance. Money might be well-spent on an attractive public relations materials which describe the programs and targets the appropriate countries and donors.

4.3.2.4 Policies and Procedures

There was general support for the policies and procedures that had been developed to date as infrastructures for the functions of the university. It was also recognized that a lot of refinement was going to be necessary as the institution continued to grow and assume increasing responsibility for its own affairs. The contributions of Cal Poly in assisting with the development and institution of policies and procedures was acknowledged as being of critical importance while it was also recognized that new relationships would need to be developed between E.A.R.T.H. and Cal Poly consistent with the new phase of autonomy and diversified needs.

To retain good faculty, policies for promotion would be one area that would need to be addressed with some urgency, and this was well recognized, particularly by the senior administration. Policies for promotion, however, will be difficult to formulate until long-range goals for the school are defined.

The overall issue of leadership, was also emerging as an important aspect of growth and diversification. The need for a participative ethos and thus style of leadership was raised by many faculty and students alike, as they reflected on the future and the assumption of increasing autonomy by the institution itself. Many were also sensitive to the conflicts that would inevitably arise with aspects of a society ill-prepared for the controversies of natural resource management in the humid tropics, and which E.A.R.T.H. would inevitably become embroiled. And again the issues of strategic and academic leadership were recognized as

being central to the ability of E.A.R.T.H. to deal with such a future.

The evaluators recognized that the faculty were beginning to see the fact that E.A.R.T.H. needs to address new issues as they arise, and that this will place new (as yet unknown) pressures on those who have to provide the leadership. Given that many of the new issues will be controversial (both within E.A.R.T.H. itself and between E.A.R.T.H. and the "world out there") and naturally laden with differing opinion and conflict, then conflict management will be something that the leaders will have to concern themselves with. Academic leadership should ask itself how well it handles conflict and how it can improve its competencies as a conflict manager.

4.3.2.5 *Curriculum and Class Schedules*

The faculty had recently completed a review of the curriculum which they had effectively inherited from another system. This was a most important event from a number of crucial aspects not the least being the issue of "control locus". The fundamental ethos of *aprender haciendo* remained undisputed with most of the amendments amounting to peripheral changes rather than substantial ones.

It was however recognized that there was still much to do with respect to the further development of curricula appropriate to the emerging conceptualization of "the new E.A.R.T.H. professional". This would need to include considerable research and debate around fundamental concepts and theories of cognition and learning.

The changes proposed as outcomes of the review conducted in June, recognized:

- The heterogeneity of entering students.

- The importance of quantitative skills, and the lack of adequate preparation of many students in this arena.

- The centrality of natural sciences and of both chemistry and physics, and the serious deficiencies in most of the entering students necessitating significant changes in the nature of the introductory courses as well as the mechanisms for their later integration.

- The need to separate and strengthen the English component of the Communications course.

- The strengthening of animal sciences and the sequencing of the units to reflect the notion of "upside down curriculum."

- Significant reorientation of the Enterprise projects with particular emphasis on working in groups.

- A significant reinforcement of the emphasis on Natural Resources and their Management plus a strengthening of the Soils component.

- A reinforcement of the work in Food Processing.

- The inclusion of a course in Agricultural Engineering at the expense of a course in the Selection of Appropriate Technologies.

- The transformation of "areas of emphasis" into "electives" in the senior year of the curriculum.

- The acceptance of the need to make "ethics" a vital theme throughout the whole of the four years of study.

- An increased emphasis on the practical applications of accounting and financial management.

These items are highlighted here as indications of the commitment of the E.A.R.T.H. faculty to reflect and review their own activities as educators, as well as their belief in the need for adjustments that represent a balance between the needs and capacities of the students as well as the maintenance of the overall vision and rigor of the curriculum. It should also be noted that the students, through their Student Government, also responded most positively to the suggested changes. They did however also record a number of their concerns including the inadequacy of the library, the need for more appropriate methods of assessment, an improved orientation course, the need to be more proactive on the matter of natural resource management, and the need to review the activities of work experience with particular reference to access to the commercial farm.

It is also salutary to note that, in citing the process of curriculum review as an example, the students felt the need to express the belief that communications between themselves and the administration, should be improved.

It would be fair to add that although progress had been seen to have been made in improving the nature of the curriculum, many faculty and students alike remain concerned at the quality of the learning, given the long hours in the field followed by classroom sessions. Many faculty also expressed their concerns at the large amount of face-to-face hours of teaching that they had to do and the impact of this on their abilities to conduct research or pursue other scholarly activities.

A number also commented on the lack of clarity of the learning by doing ethos and the lack of scholarship in the debates about change.

Very common to the emerging systemic paradigms of education around the world is the the increasing movement of self-direction by the student. This frees up the teaching load as it

gives greater responsibility to the student for his/her own learning. Accepting responsibility for one's own learning is considered as the key competency for a flexible future and Central America is going to need every flexible thinker it can find given the enormous challenge it will face over the next two decades. The evaluation team cannot emphasize too strongly the importance we attribute to the connection of E.A.R.T.H. with the emerging network of learning institutions around the world which are intensively concentrating on better ways of farming around the world, and greatly improved strategies for sustainable rural development. The quest for the "new professional" is too urgent to be left to small groups working in isolation from each other and too complex to be fulfilled by the conventions of bilateral support mechanisms.

If there is to be any single recommendation worth following it is that: E.A.R.T.H. must do all that it can to link itself into the emerging international network for systems thinking and practices for better agriculture and natural resource management. This network would also be a resource for the organization in university organization matters, including curriculum. USAID and BIFAD, in particular, have vital roles here.

4.3.2.6 Evaluations and Other Activities

Without exception, faculty felt the need to develop procedures of critical evaluation to allow them to monitor the relevance and quality of their educational practices. They recognized the need for both peer and self-evaluations.

Amongst other activities that faculty, administration and support staff and many students felt needed attention, were comprehensive plans for both the commercial and academic farms, procedures for building the book, data-base and journal collections in the library, and ways of dealing with the ever increasing flow of visitors.

4.3.3 Assessment of Long Term Viability

(a) The evaluation team has found that E.A.R.T.H. is financially viable at present. In addition, E.A.R.T.H.'s financial viability at least through 1999 is reasonably attainable, including maintenance of an endowment at approximately the $60 million level (expressed in current dollars). Under projections prepared by E.A.R.T.H., and determined by the team to be based upon reasonable and attainable assumptions, the E.A.R.T.H. endowment by the year 2,000 will be approximately the same as projected at the time of the Project Paper. The basis for these projections, and for the evaluation team's findings and conclusions are set out in further detail in Appendix 6.

(b) The evaluation team has defined E.A.R.T.H.'s "viability" as E.A.R.T.H.'s financial and managerial capacity to sustain and improve the quality of faculty, student body, facilities,

relationships and activities required to fulfill its mission. This definition of "viability" goes beyond strictly financial parameters and acknowledges an inter-relationship of E.A.R.T.H.'s financial and human resource base. Thus, in the view of the evaluation team, in order for E.A.R.T.H. to be viable it must:

- be effective and relevant ("effectiveness" E.A.R.T.H.'s capacity to maintain an institution of learning in fulfillment of its mission; "relevance" is E.A.R.T.H.'s valuation by society -- local, national regional, global -- at a sufficient level to provide the human, financial, and political resources required for the E.A.R.T.H. to be effective);

- be able to identify accessible resources;

- gain access to resources as needed;

- exercise stewardship over the resources it secures.

(c) The E.A.R.T.H. endowment was capitalized at a $50 million level rather than the $60 million envisioned by the Project Paper. The Project design called for an additional $10 million in endowment funding to serve as start-up for a dollar (versus a Colones) endowment. However, the dollar endowment was in fact capitalized through earnings on the 50 million Colones endowment. In addition, the capitalization was slowed by approximately two years because of delays in formalization of E.A.R.T.H. and the Trust structures. However, as a result of the investment policies of the Trust combined with expenditure controls of E.A.R.T.H., the endowment corpus will be at the $60 million level by the end of 1991.

(d) The E.A.R.T.H. endowment funds (local currency and foreign exchange) are, by themselves, insufficient to ensure E.A.R.T.H.'s viability for an extended period (e.g., 10-20 years) beyond the life of this Project. The E.A.R.T.H. endowment funds are sufficient to be a very important resource upon which E.A.R.T.H. may rely in maintaining its viability. The evaluation team concurs in E.A.R.T.H.'s projections that by the end of this Project, approximately one-third of its recurring costs will be obtained from endowment earnings. Other (non-endowment) financial resources to which E.A.R.T.H. must gain access and exercise appropriate stewardship include:

- from school operations
  (i) cost controls
  (ii) student payments
  (iii) miscellaneous cost recovery income

- from farm operations and other market-based activities
- from unrestricted and restricted grants

20

- from service contracts

E.A.R.T.H.'s competence in managing these resource opportunities must include managing their relationship to the endowment funds and their compatibility with E.A.R.T.H.'s program mission. In the opinion of the evaluation team, E.A.R.T.H. has the management skills and systems required to meet short term funding needs, particularly in seeking national and regional support for scholarships. E.A.R.T.H. and the Trustees have not yet developed an integrated financial resource development strategy and plan required to meet longer-term fund-raising challenges.

4.3.4 Administration

The work being addressed by the Cal Poly counterparts relating to the development of policies and procedures and manuals describing them for the use of faculty and administrators, was regarded as vitally important. Procurement had a special emphasis in this regard with particular reference to the problems encountered often with Customs Procedures. At a more fundamental level, it was recognized that the administrative functions would have to be sensitive to the changes in purpose that now appear necessary as the university heads for further autonomy.

4.3.5 External Relations

There were many domains of interrelationships with bodies, individuals and organizations that faculty and administrators at E.A.R.T.H. recognized as crucial to the development of their own organization. Included amongst these were: other educational institutions in Costa Rica and the other countries of the region, the Government of Costa Rica, farmer and other agricultural organizations, scientific peers, high schools and feeder schools in the region, potential benefactors as well as the obvious connections with the two Boards of the institution and with their connections.

Perhaps the most pressing need in this context of inter-relationship development lies in the arena of membership of international networks of institutions concerned with (a) the science and practices of agriculture in the humid tropics and (b) the praxis of participative education.

4.3.6 Continuing Education

A number of strong opinions were held about the need for E.A.R.T.H. to extend its educational function beyond the campus walls and beyond the formal provision of a university baccalaureate. For all of this, considerable concern was expressed by a number of people about the "formalization" of informal education through the Continuing Education Center. The arguments here revolved around the mixed mission between conference trade and development center, as well as the availability of time by faculty to become involved.

Another issue of vital importance however, lies in the commitment to a particular commitment to PARADIGMS of agriculture and education alike. E.A.R.T.H. needs to stand for something in relation to the philosophy of natural resource management that it espouses, as well as the ethos and thus practices of education, which it offers.

4.3.7 Environmental Assessment

It would be true to state that there is a pervading sense of unease at E.A.R.T.H., about commercial activities being conducted on campus and which represent enterprises which have been often criticised as being counter to the "sustainable development" of the humid tropics. Many faculty are both aware of, and uncomfortable with, the apparent contradictions of cattle husbandry and banana cultivation on campus. Yet these are the prevailing industries of the region and they need to be improved or, if replaced, they must be replaced with viable alternatives - especially at E.A.R.T.H. which intends to rely quite significantly on farm income!

Other issues which are being addressed under this rubric include the general impact of the buildings of the campus on the natural environment which surrounds it, as well as the intention to somehow manage the "forest" area as an "eco tourist" resource.

4.3.8 Ex post facto Summary

In summary it can be recorded that there is an acute awareness of both the present and the past at E.A.R.T.H. as it prepares itself to assume full resonsibility for its own destiny (guided of course by its two Boards).

The policies and procedures that have been adopted have enabled the university to be established in a remarkably short time and to an enviable standard. The functions which are evolving as the faculty and administrators begin to assume the full responsibility for the administration and management of the institution, are considered to be eminently relevant to the circumstances.

The resource base upon which the institution is being built, is of a high quality, ranging from the land, through the newly constructed buildings, to the most important aspect of all, the professors and those who lead them.

It is universally recognized that the STRENGTHS of the university certainly lie in the:

- leadership provided by the two Boards of the institution

- leadership provided by the Director General

- quality and enthusiasm of the faculty

- general academic profiles of the students and their commitments to the practical applications of theories in the development of enterprises appropriate to farming the humid tropics

- relationships and goodwill being built with agencies external to the university itself, but crucial to its future -- including USAID, the Kellog Foundation, the Amigos of E.A.R.T.H. and the Government of Costa Rica

- quality and commitment of the support and administrative staff and their leadership

These comments notwithstanding, there are many CHALLENGES which the university now needs to confront. These will expose any inherent WEAKNESSES which in turn might be translated into THREATS to the sustainability of the whole endeavour.

Consistent with the theory of **communicative action** as well as with the experience of a number of similar situations with reviews of universities in other parts of the world, the rest of this report will address these issues through a strategic approach to evaluation.

The submission accordingly now turns to the issues of strategic development; a process which, like this part of the evaluation itself, is characterized by complexity and "messy" uncertainty.

For scientists and administrators born of a tradition of positivistic science and rationalistic economics, these are difficult times. Strategic considerations are not made easily, particularly as the methodologies for dealing with them are still not widely known, while those that are accessible, are not easy to understand, based as they are on intellectual traditions that are post-positivist and post- rationalist.

5. THE PROCESS OF STRATEGIC EVALUATION

5.1 The Basic Process of Inquiry

Reflecting the process of experiential inquiry, the evaluation methodology comprised four basic activities: As illustrated in FIGURE 1, the process can be envisaged as comprising four basic activities:

- The collection of data, opinions, observations, perceptions and worldviews through qualitative interviews - critical conversations - and their eventual display in the form of a "mind map" of **divergent** information.

- The **assimilation**, from this divergent mind map, of key themes which have the feel

of being somehow central to the issues presented and particularly challenging, problematic or disturbing, by those interviewed.

- The **convergent** translation of these themes into models of systems which indicate ways by which the situation being evaluated might be improved, through the adoption of amended or new practices.

- The facilitation of debate about changes which are regarded as desirable and feasible by those affected by the situation originally recognized as problematic, and which **accommodate** the divergences of views of all who participate in the original divergent inquiry.

As mentioned earlier, the process of strategic evaluation follows a four-stage cycle of experiential inquiry. The report accentuautes this process by emphasisng the focus of each of the stages, briefly describing the activities that were carried out, and exposing the outcomes as a series of critical questions.

FIGURE 1: THE EXPERIMENTAL SYSTEMIC APPROACH USED IN THE EVALUATION

Critical conversations between the evaluators and interviewees, representing a DIVERGENCE of facts, opinions perceptions and so on, of a wide constituency.

The interpretation of the data present by the conversations by a process of ASSIMILATION into plans for action

The translation of the convergent models through a process of ACCOMODATION into actions

The development of models of systems of human activities considered, through a CONVERGENT process to be appropriate as a basis for planned change

5.1.1 Divergence: A Summary of the Data Collected

The "mind map" expressing the collective perceptions and "stories" of those interviewed during the evaluation of E.A.R.T.H., (and which was used in the presentations to E.A.R.T.H. faculty and staff (24th and 25th July) as reflections back to those who stated them, as well as to USAID/Costa Rica (29th July)), filled a wall chart measuring 3 X 4 meters!

The essence of these conversations can be gathered from the selection of quotations given in Appendix 1, whilst the essential nature of the "mind map" itself, can be gathered from the summarized version duplicated overleaf in Figure 2.

The critical conversations followed a number of lines of inquiry. These included the following:

- the historical context of the institution and those who comprise it;

- the nature of the curriculum, its design, management and evaluation;

- the students, in terms of their recruitment, living conditions, learning conditions, orientation, quality of learning, academic needs, understanding of and commitment to curriculum process, their social, spiritual and psychological needs, the adequacy of their scholarships, the quality of their support resources and gender issues;

- the faculty in terms of their recruitment, orientation, and engagement in the conduct of the curriculum, in the development of the students, and in the development of the institution. The multi-facets of their role, their load, the quality of their own learning environment, their opportunities for professional development, their living environment, the level of their scholarship in (a) the development of responsible agriculture in the humid tropics and (b) the development of an educational paradigm relevant to the former

- the quality and dynamics human relationships within E.A.R.T.H., and among E.A.R.T.H. and its constituencies. The social, intellectual, spiritual, cultural, and psychological needs of faculty and members of their families. Particular relationship with USAID/Costa Rica, Kellogg and Cal Poly.

25

Figure 2: A Summary Presentation of the EARTH Divergent Mind Map.

- The staff in terms of their recruitment, orientation and engagement in the conduct of the curriculum, in the development of the student and in the development of the institution (see faculty above)

- Financial systems, dimensions and physical plant and buildings.

In the "mind map" itself a number of key words seemed to emerge: pioneering, stress, linkages, professional development, load, orientation, needs, role, the new professional, ethical consistency, learning community, conditions, scholarships, quality evaluation, quality of learning, time, integration, intellectual disposition, philosophy, natural resource management, novel systems, research, impact of present practices.

This process of "mapping" key words in conversations and aggregating them into a loose form of divergent pattern -- with one idea giving impetus to new orders of ideas -- represents a "collective mind map" or "rich picture" of the issues as perceived by those experiencing the "every-day-ness" of the organization. This is perhaps the first key point to emphasise in this description of the process and its outcomes.

The rich picture is a presentation of the perceptions of those who constitute the organization (whilst the actual pattern of their recording, is a reflection of the style of the particular evaluator).

5.1.2 Assimilation: The Identification of Themes

The second step in the methodology is for the evaluator (now acting as analyst rather than interviewer) to examine the mind map for themes that might recur in the language of the "map" itself or as tacit messages underlying the "pattern of words". This part of the process is entirely abstract, as the evaluators attempt to conceptualize the issues as perceived by their "clients", as themes or "streams of consciousness" as they are sometimes called. The intention is to represent issues which might seem familiar, in unfamiliar ways with a logic that argues that insights come from viewing the familiar in an unfamiliar manner.

The following major issues were identified by the evaluators (and stated in their words) through analysis of the divergent "mind map" drawn up from the critical conversations and document reviews:

- The PURPOSE/MISSION of the institution and the its STATUS as a school/college/university

- The PARADIGM of E.A.R.T.H.; the PRAXIS of the faculty and students; the QUALITY of the learning experience

- The nature and the quality of TEAM RELATIONSHIPS within the university and between the university and its outside constituencies

- A number of issues and themes concerning the quality and extent of the university's RESOURCING

- The nature of, and the range of ORGANIZATIONAL DEVELOPMENT PROCESSES

A number of other sub-issues emerged in this manner:

- changes/conflicts/contradictions/ambiguities/paradoxes

- participation/linkages/networks/participative   strategic   planning/constituency linkages

- interpretation/articulation/capacity/workloads

- faculty development/functional leadership.

Finally, a set of focus words were imposed to capture the sense of many of the messages.

These were:

- VISION
- PARADIGM
- PRAXIS
- CONTRADICTIONS
- TENSIONS
- RELATIONSHIPS
- PARTICIPATIVE MANAGEMENT
- STRATEGIC DIRECTION
- LEADERSHIP

In terms of major themes the three triggers which emerged were:

- The E.A.R.T.H. context
- The E.A.R.T.H. graduate as a professional
- The E.A.R.T.H. academic.

And to these could be added:

- The sustainability of the institution

Underlying many of the issues revealed though the documentation review and analysis of the critical conversations, was a sense of ambiguity and confusion about the fundamental purpose, mission and nature of the institution as well as about its educational model and the ethos of its learning environment.

These issues then suggested themselves as being amongst the key themes around which changes in the way things were currently being done at E.A.R.T.H., might be profitably pursued.

Seven key themes emerged in this manner and they are expressed here in the form they were presented both to the faculty and to USAID/Costa Rica.

Key theme #1:

The need for the faculty to generate, and own an encompassing definition of the purpose of their university.

From the comments made in conversation and in the documents examined, there seemed to be considerable confusion around the actual MISSION of the university, with quite a number of different versions being recorded in both documents and conversations. The underlying issue, it was felt, had to do with the perception of the fundamental PURPOSE of the

university, and the need for a unifying statement to this end. The following STATEMENT OF PURPOSE is proposed as a focus for debate about a purpose that is clear and acceptable to, and therefore owned by "those who have to make it work".

It is not stated as a recommendation, but merely as a statement around which debate can ensue. The key question being addressed is... Just what does E.A.R.T.H. exist to do? To what paradigm of development, does it subscribe?

> **E.A.R.T.H. IS AN INTERNATIONAL AGRICULTURAL UNIVERSITY WHICH THROUGH A PROCESS OF PARTICIPATIVE HUMAN INQUIRY (active learning) FACILITATES THE DESIGN, CREATION, MAINTENANCE AND EVOLUTION OF SYSTEMS OF AGRICULTURE (for the humid tropics of the Americas) WHICH ARE COMMERCIALLY SENSIBLE, SOCIALLY DESIRABLE, ECOLOGICALLY COMPATIBLE, CULTURALLY FEASIBLE AND ETHICALLY DEFENSIBLE.**

Each of these words has been chosen quite deliberately, as has each phrase. Each deserves close attention and debate by the faculty, acting as a group, for in its finally agreed form, the STATEMENT OF PURPOSE (of the system) will be used as the basis of the PARADIGM for the institution to use in developing all of its future activities - be they formal curriculum development and management, continuing education, research, extension or other outreaching activities, or the further strategic development of the institution itself.

A number of questions assist in the process of focusing:

Is **E.A.R.T.H.** an **INTERNATIONAL** institution?

Is it a **UNIVERSITY** (rather than a "college" or a "school" where the distinction is important in terms of the graduates being percieved as critical thinkers, practical philosophers and liberally educated people, as well as competent scientific and technological practitioners)?

Is the process of **PARTICIPATIVE LEARNING** a more desirable focus for, and accurate description of, the educational paradigm being used, rather than **LEARNING-BY-DOING**, hands on experience, or "aprender haciendo"?

Is the primary function of the university better stated as the **DESIGN, CREATION, MAINTENANCE** and **EVOLUTION** of **SYSTEMS** of **FARMING** in the **HUMID TROPICS** as the purpose of the institution (portraying it as significantly more than a teaching institution that is unconventional simply for the educational process that it uses

but restating the aim of what it is fundamentally trying to achieve in the name of responsible management of the humid tropics)?

Does the faculty accept the need for new systems of farmimg in the humid tropics which are **COMMERCIALLY SENSIBLE, SOCIALLY DESIRABLE, ECOLOGICALLY COMPATIBLE, CULTURALLY FEASIBLE** and **ETHICALLY DEFENSIBLE** and if so, how can they contribute to such developments and, furthermore, how can they involve the students in the same quest?

In helping to answer these questions, the key theme was transformed into a "human activity system" as illustrated in the **CONVERGENCE** section (which follows a little later in this report).

Prior to examining the form and significance of this model system, the remaining major themes are outlined.

<u>Key theme #2:</u>

> **The need for the faculty to continue with the process of fundamentally re-examining the competency profile of their intended graduates in the light of a re-focused PURPOSE for the university and further reconceptualization of the learning process.**

Many faculty and students alike, alluded in their converstions with the evaluators, to the need for E.A.R.T.H. to produce a **NEW STYLE OF AGRICULTURAL PROFESSIONAL** for the humid tropics.

Attention is drawn here to the useful concept of **PRAXIS** -- the set of behaviours, which each of us develops, as we go about the function of **being** someone. Our praxis represents the interrelated manner by which we use our understanding of the world about us, to inform what we do in it and to it -- and vice versa: learning new understanding about the world as we reflect on what we are doing in it and to it - in particular as professionals.

Focusing on the way E.A.R.T.H. students will develop a praxis which will remain relevant throughout their subsequent professional lives working as responsible professionals in the humid tropics, provides a useful context for the reconceptualization of the competency profile of graduates, as well as providing a focus for reexamining the educational paradigm.

Praxis then is one of the key issues for educational adaptation at E.A.R.T.H.. In this regard a useful way of evaluating a curriculum is to examine the quality of, and balance between, strategies for the development of (a) learning for theory and understanding (or learning for knowing for propositional knowledge -- **THEORY**), (b) learning for practical application (or learning for doing for practical knowledge -- **PRACTICE**), and (c) learning for praxis (or

learning for knowing for propositional knowledge -- **THEORY**), (b) learning for practical application (or learning for doing for practical knowledge -- **PRACTICE**), and (c) learning for praxis (or learning for being for experiential knowledge -- **PRAXIS**).

FIGURE 3: A MODEL FOR ASSESSING THE BALANCE OF A CURRICULUM
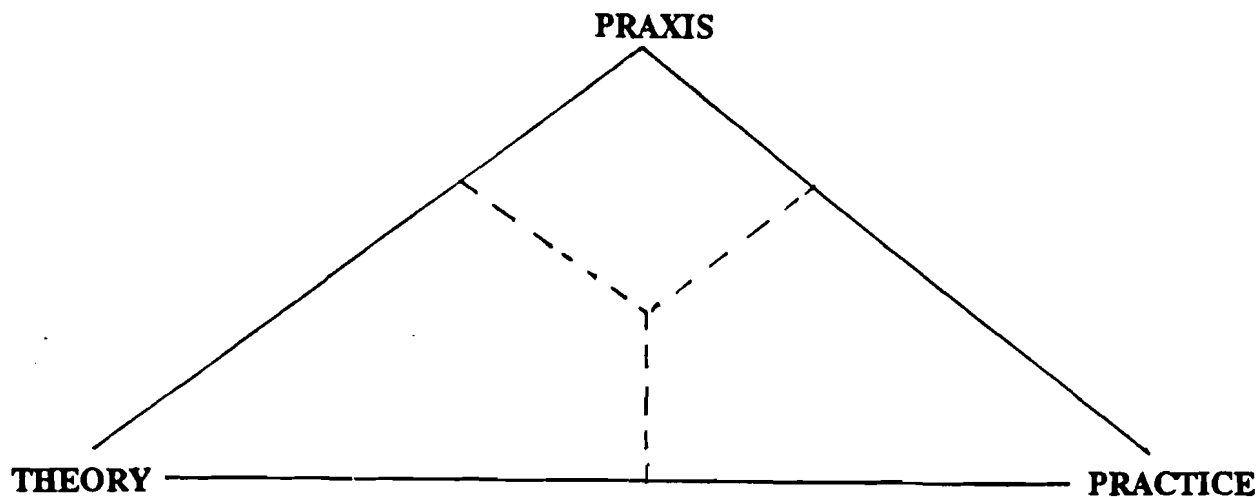
Interpreted as different ways of knowing, this model can give further clues on curriculum organization. Thus:

    THEORY   = **learning by "theoretically" KNOWING**

    PRACTICE = **learning by "practically" DOING**

    PRAXIS   = **learning by "experientially" BEING**

Translated into Spanish, these might read:

    THEORY   = **aprender ESTUDIANDO**

    PRACTICE = **aprender HACIENDO**

    PRAXIS   = **aprender SIENDO**

Analysis of the current, amended curriculum model, of comments from faculty and students, and from first hand experience, suggests that the schema above could prove to be most useful as a framework for further discussions about the development of an appropriate curriculum at E.A.R.T.H.. The current emphasis on "aprender haciendo" as an ethos (which extends right back to the earliest days of planning the vision), is probably discouraging more fundamental reconceptualizations of the educational approach of the university. It is important that this commitment does not become an obsession in later years, so transforming a powerful strength into a myopic weakness. Confusion still exists amongst the faculty, about the nature of this "philosophy", about its interpretation into sound pedagogical practices, and about its overall importance in the educational paradigm that E.A.R.T.H. is developing. It is hoped that the Critique of Learning by Doing provided as Appendix 7 to this document, will prove useful in any debates about the topic.

This notwithstanding, there is strong developmental logic recognizable in the existing curriculum. It is a heavy load, in terms of both actual hours per week of committed time to classes, laboratories and field work, to examinations and to assignments, and to "entrepreneurial activities". It is also a heavy academic load in the breadth of the subject "coverage". Finally, it is a heavy load in terms of annual units and indeed term times.

A number of doubts were raised by students and faculty alike, about the quality of the learning that occurs under such "heavy" loads.

In some senses the loads on faculty are even heavier with the policy of duplicating and even triplicating classes to maintain the student group sizes at levels around 25-30. A number of faculty expressed a felt need to get "time out" if they were to avoid "burn out."

Perhaps the most important area of WEAKNESS in the current curriculum however, is the lack of a PARADIGM which represents the faculty's way of dealing with the complexities inherent in farming systems for the humid tropics. While there is some emphasis on systems approaches to such issues as the design, planning and management of integrated enterprises in the current curriculum, it is certainly not a pervasive theme. It will be appropriate for this debate about more holistic views of (1) agriculture and (2) ways of learning about agriculture, to be extended in future years.

Key theme #3:

> **The need for the faculty to reconceptualize their own praxis (a) as agricultural scientists concerned with the design, creation, maintenance and evolution of responsible systems of farming and natural resource management in the humid tropics, (b) as educators concerned with the design, creation, maintenance and evolution of responsible systems of education for students keen to become competent as responsible professional agriculturists for the humid tropics, and (c) as ethical human**

education for students keen to become competent as responsible professional agriculturists for the humid tropics, and (c) as ethical human beings concerned with the continuing development of their university.

The model below (Figure 4) tries to capture this essence of the E.A.R.T.H. academic.

FIGURE 4: A MODEL OF THE E.A.R.T.H. ACADEMIC
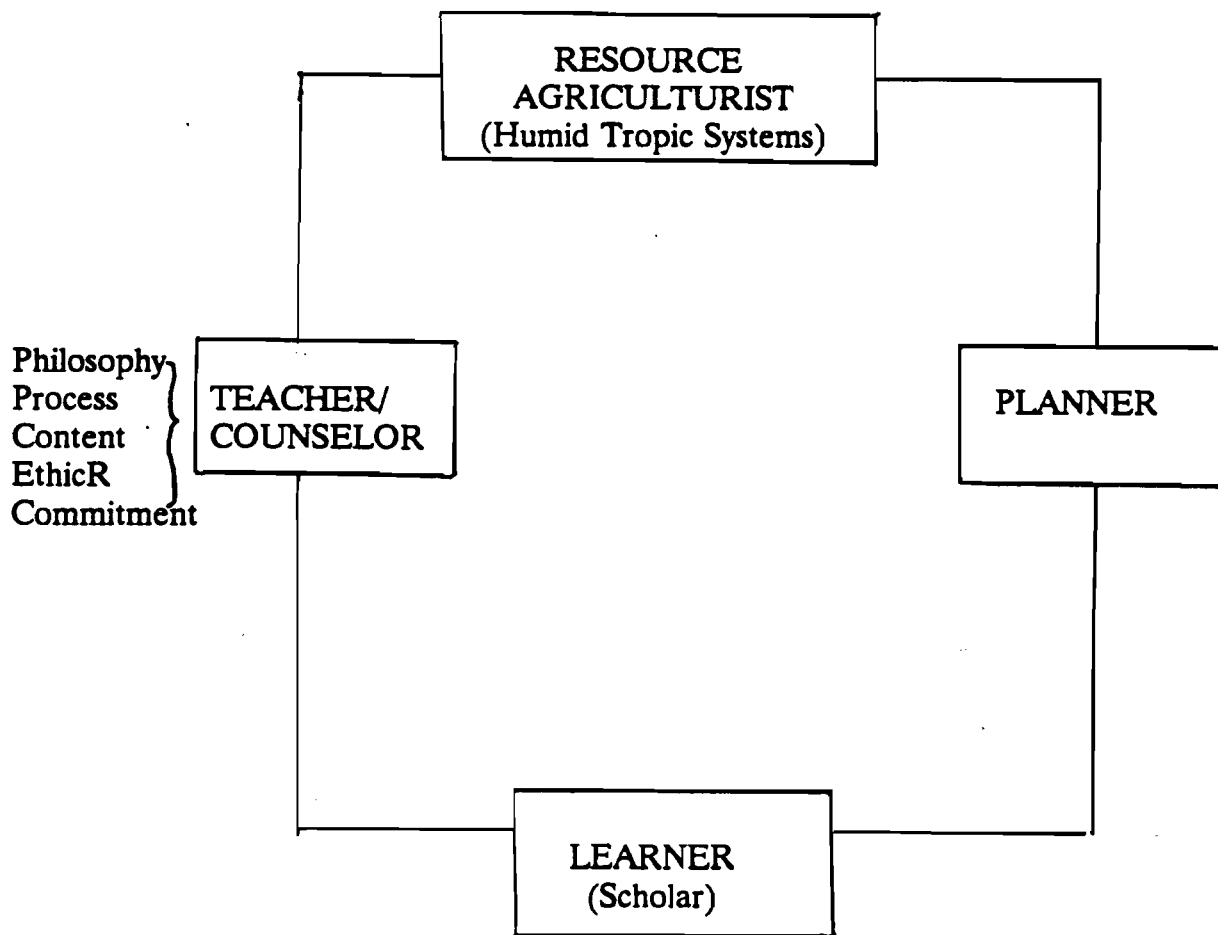
This is clearly a multidimensional praxis. At present, faculty are focussing most of their commitments on to the novel process of education at E.A.R.T.H.. This focus will need to shift however, if the university adopts a broader conception of PURPOSE as suggested earlier. In other words, faculty are beginning to face the new challenge of broadening their roles to embrace the investigation of new systems of farming the humid tropics which are both productive and more sustainable. They will need to develop new ways of learning about complex systems just as they will need to develop new ways of facilitating such learning by others.

<u>Key theme #4</u>:

The need for faculty and administrators to create and maintain a CRITICAL LEARNING SYSTEM at E.A.R.T.H. which:

- "allows faculty to model the PARADIGM (role models) and develop a relevant PRAXIS for themselves.

- allows students to learn appropriate competencies (PRAXIS) through a critical, participative process of (action) learning

- is itself, commercially sensible, socially desirable, environmentally compatible, culturally feasible, and ethically defensible"

The key concept here comes from organizational and systems theories, presenting the idea of an organization -- like a university -- as a collection of learning human beings who can share their individual learning in such a way that the "whole system" seems to be able to learn.

The other important notion here is that of being **CRITICAL**. Critical learning is learning under circumstances where everything is subject to the critique of the learner -- including the manner of learning!

The disposition of the **CRITICAL LEARNER** can be described as one who is commited to the permanent quest of looking for improvements -- again including those concerned with the way such improvements are sought!

The essence of a **CRITICAL LEARNING SYSTEM** then is characterized by an organization in which (a) what things are being done (b) why such things are being done, (c) the way by which those things are being done and (d) who is doing them, all come under continuing appraisal.

The implication of this for the E.A.R.T.H. faculty, administrators and students, is that they become committed to the continuing strategic amendments of their learning system in order to continually improve the quality of the key functions as they relate to the essential purpose of the institution as agreed by those who comprise and govern it.

The notion of critical learning, also brings new dimensions to the competency profile of the graduates and thus to (a) the curriculum itself as well as (b) the process of its review and renewal.

<u>Key theme #5</u>:

The need for students, graduates, faculty, administrators, trustees and directors, to continually build quality relationships (a) within the E.A.R.T.H. community itself and (b) between the university and those environments in which it operates.

The key focus therefore becomes the development of processes to facilitate the nurturing of quality relationships between:

- faculty and administrators and directors
- faculty and students
- faculty and other faculty
- E.A.R.T.H. and its agricultural environments
- E.A.R.T.H. and its support university peers
- E.A.R.T.H. and its benefactors
- E.A.R.T.H. and the international academic community

And the equitable participation in such processes by all who are likely to be affected by the outcome. An important issue here is the ability to judge the quality of relationships that are established, as well as to the way priorities are allocated to this function across the wide spectrum of constituencies and networks.

Faculty will need to be able to make judgements about to what extent they subscribe to the current "open door policy", not just with students, but with all those with whom they need to interrelate -- including each other.

The notion of **QUALITY TIME** becomes central here: If certain activities, like meetings, are not fulfilling high priority needs, then mechanisms need to be developed to allow them to be improved. The ability to judge the essence of **QUALITY** also becomes a fundamental competency to be developed.

Key Theme #6:

The need for students, graduates, faculty, administrators, trustees, governors and all else who are "friends of E.A.R.T.H.", to clearly articulate and promulgate the PURPOSE of E.A.R.T.H. in ways which illustrate its responsibilty in addressing the ethical management of the natural resources of the humid tropics of the Americas.
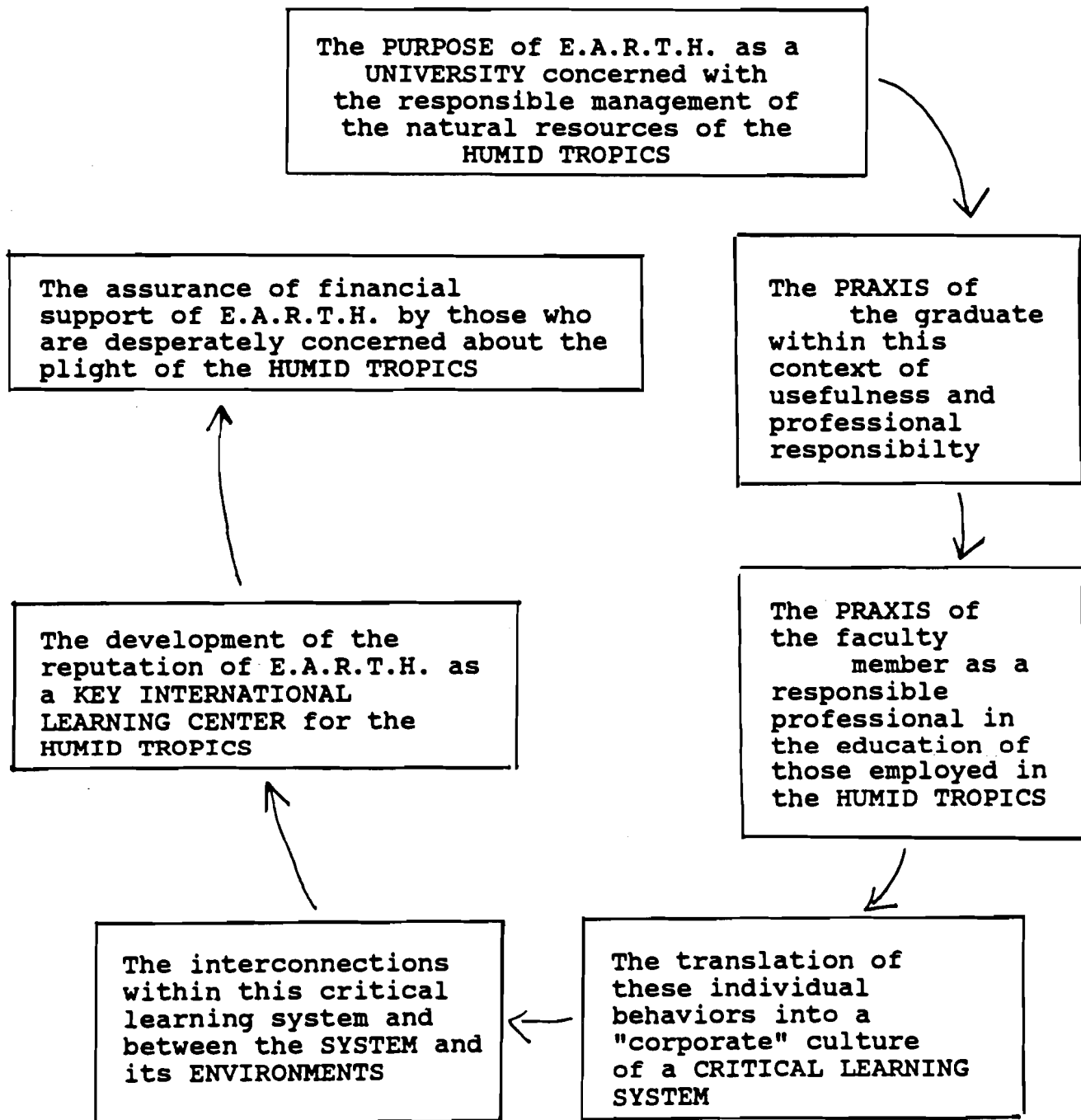
It is in this manner that E.A.R.T.H. will be able to gain access to, and exercise stewardship over, sufficient funds to persist in its role as the **KEY INTERNATIONAL LEARNING CENTRE** for the management of the humid tropics in this hemisphere.

This then completes the "circular logic" of the case presented in Figure 5.

This then completes the "circular logic" of the case presented in Figure 5.

**FIGURE 5: THE LOGIC OF THE OUTCOMES OF THE PRESENT
EVALUATION**

```
          ┌───────────────────────────────┐
          │  The PURPOSE of E.A.R.T.H. as a │
          │    UNIVERSITY concerned with    │
          │  the responsible management of  │
          │  the natural resources of the   │
          │          HUMID TROPICS          │
          └───────────────────────────────┘
```

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┌───────────────────────────┐        ┌───────────────────────┐
│ The assurance of financial │        │ The PRAXIS of          │
│ support of E.A.R.T.H. by those who │        │     the graduate       │
│ are desperately concerned about the │      │ within this            │
│ plight of the HUMID TROPICS │        │ context of             │
└───────────────────────────┘        │ usefulness and         │
                                      │ professional           │
                                      │ responsibilty          │
                                      └───────────────────────┘
```

```
┌───────────────────────────┐        ┌───────────────────────┐
│ The development of the     │        │ The PRAXIS of          │
│ reputation of E.A.R.T.H. as │        │ the faculty            │
│ a KEY INTERNATIONAL        │        │     member as a        │
│ LEARNING CENTER for the    │        │ responsible            │
│ HUMID TROPICS              │        │ professional in        │
└───────────────────────────┘        │ the education of       │
                                      │ those employed in      │
                                      │ the HUMID TROPICS      │
                                      └───────────────────────┘
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┌───────────────────────────┐        ┌───────────────────────┐
│ The interconnections       │        │ The translation of     │
│ within this critical       │        │ these individual       │
│ learning system and        │ <───   │ behaviors into a       │
│ between the SYSTEM and     │        │ "corporate" culture    │
│ its ENVIRONMENTS           │        │ of a CRITICAL LEARNING │
└───────────────────────────┘        │ SYSTEM                 │
                                      └───────────────────────┘
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36

<u>Key theme #7</u>:

> **The need for faculty, students and administrators to develop ways of dealing with the ambiguities, conflicts, risks, tensions uncertainties, and paradoxes inherent in living and learning in, and learning about managing the humid tropics.**

Living and learning as part of the E.A.R.T.H. community, brings with it certain psychological, social, and intellectual tensions. The source of many of these were constantly referred to during the "critical conversations" - load, isolation, and lack of complete understanding about the whole purpose of the exercise, were the three majour sources of concern. Others included financial, academic, and interpersonal and family.

Developing ways of dealing with these tensions as the **MANAGEMENT OF CONFLICT** is as essential to the continuing integrity of the E.A.R.T.H. system, as it is a vital competency for those intent on working in agricultural and rural development, and on responsible management of natural resources in the humid tropics, to master.

Bringing conflict out into the open is always a risky business, especially in a relatively closed and isolated organization like E.A.R.T.H.. Yet unless this is done, serious damage can occur to the social system wich constitutes the E.A.R.T.H. system, and high quality experiential learning opportunities will also be lost.

5.1.3 Convergence: The Development of Models

Where **divergence** and **assimilation** were both processes concerned with FINDING OUT about the situation -- the former from the CONCRETE world of the "actual" perceptions of the "actors" involved in the E.A.R.T.H. community and the latter from the ABSTRACT world of the interpretations of the perceptions of the "actors" by the evaluators -- the process of **convergence** is the first of the two TAKING ACTION steps -- in this case in the abstract world.

The major activity of convergence in this systemic methodology, is the transformation of the previously identified key themes into models of **systems of human activities.** In other words, the models that follow, represent a way of identifying and linking activies that need attention in the process of TAKING ACTION FOR CHANGE.

Only the first of the seven themes are actually modelled here. Further elaboration would have tended to confuse the issue, while the remaining themes remain ideal candidates for the faculty to work through when the opportunity arises, to allow full engagement with this as a participative process.

KEY QUESTION: What major set of activities would have to be carried out to help improve the issues associated with the first of the **key themes** recognized from the analysis of the E.A.R.T.H. data?

<u>Key theme #1</u>:

> **E.A.R.T.H. is an international agricultural university which through a process of participative human inquiry (active learning) facilitates the design, creation, maintenance and evolution of systems of agriculture (for the humid tropics of the Americas) which are commercially sensible, socially desirable, ecologically compatible, culturally feasible and ethically defensible.**

Let us argue that for this to occur, the following four major interrelated activities need to be scheduled at E.A.R.T.H.:

- Development of a process for PARTICIPATIVE HUMAN INQUIRY

- Development of ways of developing NEW SYSTEMS OF FARMIMG

- Development of the ORGANIZATION as a UNIVERSITY

- Development of processes for FACULTY DEVELOPMENT

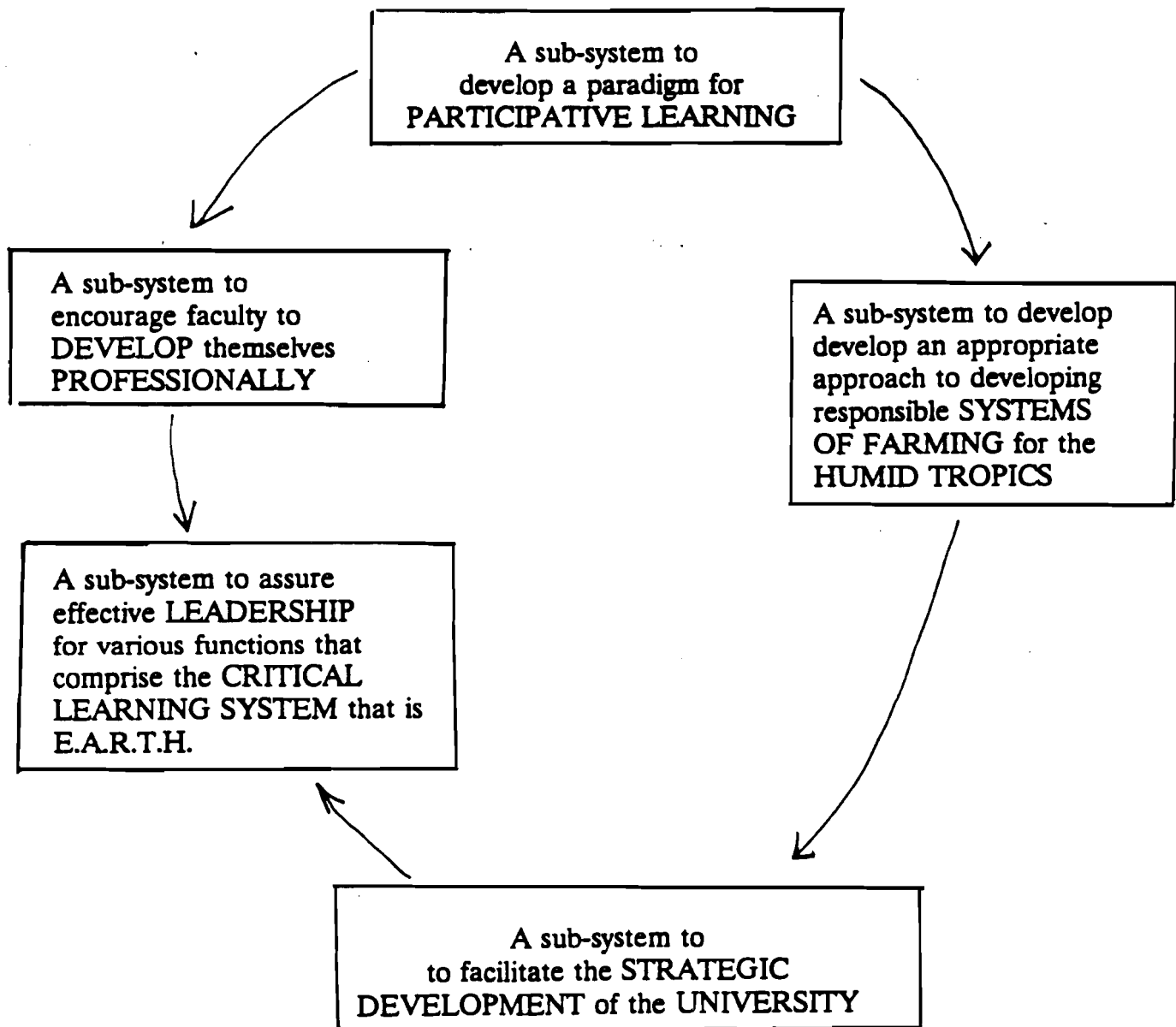(And all of these in turn, need to be stimulated by appropriate leadership).

In other words, E.A.R.T.H. needs to continue to pay close attention to:

- Its educational (learning) paradigm.

- Its approach to responsible systems of farming and resource management in the humid tropics.

- Its processes for strategic development as a university.

- Its processes for the professional development of faculty.

- Its predominant style of leadership.

Such activities are not easily programmed or conducted, for a whole variety of reasons. The next task to be accomplished then, is to identify these constraining reasons, and represent them as "factors in or demands from, the environment".

All of these issues can be envisioned as if they comprised a system: An abstraction based on the notion of a "whole entity" which will only do what it has to do, when its parts interact successfully together. These parts can be represented as "sub-systems" -- sets of basic activities -- and when these are interrelated, they can be framed into what might be called a "human activity system".

FIGURE 6: A MODEL OF E.A.R.T.H. AS A HUMAN ACTIVITY SYSTEM

A sub-system to
develop a paradigm for
PARTICIPATIVE LEARNING

A sub-system to
encourage faculty to
DEVELOP themselves
PROFESSIONALLY

A sub-system to develop
develop an appropriate
approach to developing
responsible SYSTEMS
OF FARMING for the
HUMID TROPICS

A sub-system to assure
effective LEADERSHIP
for various functions that
comprise the CRITICAL
LEARNING SYSTEM that is
E.A.R.T.H.

A sub-system to
to facilitate the STRATEGIC
DEVELOPMENT of the UNIVERSITY

A way of checking out the sensibility of this model is to elaborate on a number of its key properties (illustrated by the acronym TWO ACES)

T ransformation of the Americas. = learning to create responsible farming practices for the humid tropics

W eltanschauung = the need for practices which are commercially sensible, socially desirable, ecologically compatible, culturally feasible, and ethically desirable.

O wnership = the Board of Directors and eventually, the faculty

A ctors = all who comprise the E.A.R.T.H. learning community of those who deal with change as facilitators.

C lients = all who farm in the humid tropics of the Americas, from the export oriented estate owner, through the medium to small commercial enterprise holder, to the small, marginal subsistence farmer.

E nvironment = characterized by conflicts, contradictions, tensions, complexity, change and paradoxes.

S ystem = a highly interdependent group of participative learners, concerned with the development of:

(i)   a paradigm appropriate to T

(ii) philosophies and methodologies of pedagogy relevant to C

(iii) a praxis appropriate to A

(iv) a learning organization with W characteristics which "exists" in an environment E

In essence then, this model illustrates the core of the activities that need to be addressed in the next stage of the transformation of E.A.R.T.H. as an international university as well as the basic environmental forces which threaten progress in that regard.

5.1.4 Accommodation: Action plans as critical questions

- **Development of a process for PARTICIPATIVE HUMAN INQUIRY**

What mechanisms exist to encourage and support the E.A.R.T.H. academics in their quest for rigorous theories, philosophies and practices relevant to the creation of curricula relevant the complexities of managing farming systems and natural resources in the humid tropics?

What factors among the faculty, or between the faculty and students, or within the student body, constrain the development of more participative, high quality and critical systems of inquiry - or action or experiential methods of learning?

What pressures from beyond E.A.R.T.H., come from the scientific peers of the E.A.R.T.H. academics and administration, and what form do they take?

What linkages are being made to facilitate access to new educational paradigms as developed by theorists, philosophers and practitioners elsewhere?

What effects are the expectations of those in the community having on the direction E.A.R.T.H. is taking, or on the nature of the processes it is using to achieve its purpose?

What effects are the expectations of actual and potential students and of potential employers, having on the educational paradigm at E.A.R.T.H.?

What effect is its past heritage or present support systems having on the extent of any challenge to the present E.A.R.T.H. educational paradigm?

How are the academics at E.A.R.T.H. dealing with the conflicts, contradictions and tensions represented by the different demands of the various constituencies and domains to be served by the E.A.R.T.H. graduates - of the commercial export orientations of the "fincas multifamiliares", of the food security horizons of the "fincas famialiares", of the appalling conditions of many of the "fincas sub-familiares", and of the integrity of the land of the humid tropics in general?

How are the students learning to deal with such conflicts as an integral part of their learning how to become better agriculturists?

What incentives are there for the E.A.R.T.H. community to continue the quest for improved "ways of learning", and how can any progress in this direction be evaluated?

How is E.A.R.T.H. assuring itself of an adequate and on-going supply of students with the capacities and dispositions to learn in these new ways as they are developed?

- **Development of ways of developing NEW SYSTEMS OF FARMIMG**

41

How are the E.A.R.T.H. academics approaching the issue of the "real" purpose of their university in terms of its commitment to the development and management of novel and responsible systems of agriculture and natural resources?

How are they resolving the dilemma presented on the one hand by their "teaching" loads and on the other by the need for developing knowledge about what needs to be "taught" in terms of the complex issues and challenges of the humid tropics of the Americas?

What linkages are being built between the E.A.R.T.H. academic community and other researchers and academics who are concerned with similar issues of humid tropics?

How are the E.A.R.T.H. academics informing themselves and their students about the ever changing dynamics of the Central American isthmus in all of its dimensions - sociological, demographic, political, cultural, economic, physical and so on?

To what extent are the commercial activities of E.A.R.T.H., and in particular the farming ones, reflective of new ways of thinking about "novel and ethically defensible systems of farming" or "responsible natural resource management", and how are the academics involved in the development of such strategies?

How are the academics, traditionally "trained" in scientific disciplines, learning to deal with the new demands of interdisciplinarity (or systemics)?

- **Development of the ORGANIZATION as a UNIVERSITY**

What is the nature of the debate about the preferred status of the institution -- be it school, college or university; and be it sustainable agriculture, and/or natural resources and/or rural development?

How are the various members of the E.A.R.T.H. community addressing the issue of the quality of the relationships that exist within the university -- and of the psychological, social, spiritual, recreational personal and interpersonal needs of each other?

How are new members of the community "oriented" to the customs and mores that are beginning to characterize the culture of E.A.R.T.H.?

How is the participation of all members of the community being assured in the crucial function of the strategic development of the organization of which they are a vital part?

How are the members of the E.A.R.T.H. organization interrelating in such a manner that they are together constituting a "critical learning system"?

How is E.A.R.T.H. as a system "learning its way" through vital issues of political and financial stability and sustainability?

- **Development of processes for FACULTY DEVELOPMENT**

How are faculty members of E.A.R.T.H. learning to learn "their way through" all of the new challenges that life at E.A.R.T.H. is presenting?

How are faculty members beginning to plot their careers in their new context?

Are faculty members finding "quality time" in which to pursue the issues of moment, fundamental to the clarification of the two paradigms essential to E.A.R.T.H.: that of the approach to managing the resources of the humid tropics, and that of the approach of helping others to learn about that too?

How are faculty members dealing with some of the more important personal and social tensions that are inevitable at a new institution, and especially one that is somewhat remotely located?

How are faulty exploring the concept of the need for a new professional praxis both for themselves, as academics at E.A.R.T.H., and for their students, as potential graduates of E.A.R.T.H.?

How is the financial sustainabilty of the institution being assured and how participative is the process of financial planning, allocation and management?

And so on. With the systems model providing a conceptual framework for critical questions of this order, the discussions among the members of the E.A.R.T.H. community can not only be better focussed, but together can present a whole new perspective on the behaviour of complex organizations.

With the university conceptualized in this way - as a critical learning system -- other characteristics and dimensions can be explored and evaluated. An obvious example is that of the Strengths and Weaknesses of the system itself, in the face of the Opportunities and Threats presented by the forces in its environment -- a new twist to the familiar SWOT analysis of management consultancies!

5.1.5 Post Script

There is little doubt that E.A.R.T.H. has been built on a very sound foundation. It already has an exciting new approach to education for the region and there are many fine young women and men enrolled in the first two years of the program. There is a very talented group of faculty in place and the physical resources, with the notable exception of the library which is still under construction, are of an exemplary standard. The administration of the university is in extremely capable hands, and the general calibre of leadership, is high.

But now come the next, difficult steps of further growth, futher development and further transformation and metamorphosis. The years ahead will not be plain sailing for the organization, and there will be many pressures with which the community at E.A.R.T.H. will have to deal.

Life in the humid tropics of the Americas holds many huge challenges but with a disposition, commitment and talents to learn new ways of learning, those within the community of the Escuela de Agricultura de la region Tropical Humeda, will indeed be the difference that makes a difference.

It is the hope of this small team of evaluators that in our own way we too will have helped in that function. Our best wishes go to all involved in this vital endeavour.

6.   CONCLUSIONS

From all that has been stated above, it is clear that E.A.R.T.H. is indeed at a vital stage in its evolution as a significant international center dedicated to the development of responsible farming systems for the humid tropics of the Americas. To move to a stage of increasing autonomy, the university must now take in hand the following:

- The definition of a clear "mission" statement which allows it to clearly state its purposes in terms of its intentions in research, education and extension and public service.

- The development of a particular "way of going about its business" which reflects these various activities, and which illustrates how they are interconnected.

- The development and management of novel curricula which reflect firmly held worldviews about the nature of learning as well as about the nature of responsible natural resource management.

- The refinement of processes of communication and critical debate which encourages the participation of all those affected by the system to be involved in its strategic developments as a resources critical to the future development of the humid tropics of the Americas.

- The development of networks of relationships both within the university and between the university and influential centers in its environments such that states of mutual co-evolution are initiated.

*   *   *

One final word relates to the inherent danger in translating concepts from one language to

44

another. In the literature from E.A.R.T.H., for instance, the words SCHOOL, COLLEGE and UNIVERSITY are used interchangeably in English translations of the word UNIVERSIDAD. The distinctions between the meanings of these words is most significant in the international literature. There are many other examples and this issue deserves particular emphasis during the next round of "strategic discussions".

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APPENDIX 1
A SELECTION OF QUOTATIONS FROM THE INTERVIEWS AT E.A.R.T.H.

"...did stay close to the master plan....the only difference is that they wanted more interaction with the community so they moved the sports part up to the front".

"...spend money now and save in maintenance later or build cheap...".

"But here we work more with the communities...".

"...philosophy of learning by doing...".   "...need for a different type of professional is very important...many universitites fail at working in the countryside with the campesino...".

"...could maybe buy a small farm close to the school...the first year was very hard....stress living away from the family".

"...remedial classes....everyone sacrifices".

"The last book I read took a year to read--Extinction, Paul and Anne Elerlichman...".

"I take the students to the small producers---Taro, Yuca, Platano...".

"...the farmers say that they want the students to come into the campo and not stay in the academy...".   "...I know that the students can't be the saviours and I am worried about the expectations".

"....the second year is very hard..they complain that they don't have time to learn anything deeply...".

"....the evaulation feedback from the students was a thermometer...".   "...the day that team teaching is lost the school will not survive...I feel that this is one of the key factors..."

"...a great possibility to develop lands in this country...".

"..the faculty maybe did not think about ecology when the school first started....".

"..Refurbishing education...true here...true most anywhere...." "...new moral values".

"Proper economic model...".

"... the students must learn to work directly with the agricultural systems...".

"...here is a curriculum which confronts the student with the whole picture....said it is an upside down curriculum...".

"...we are very good at analysis of parts but how to handle the whole...".

"...we are on a path...I do not know how this will end...the curriculum is a process not a thing...". "...the folks who designed the curriculum were in a vacuum, the curriculum has to be ours".

".Bregar con el cambio..".

"..This is a problem of having the family far away...".

"...what to teach the kids has to come from somewhere and we maybe need some applied research to help the students learn how to find out things when they do not have the answers...".

"...there the pay is low and the teachers have to have other jobs, here you do not have to have another job...can dedicate more time to the job...".

"I haven't talked with students much about their desires.,..there are too many meetings...".

"It is an international school...".

"The worry is to be sure that the graduates are employable.."

"...all are computer literate.."

..Kellogg says emphasis with small farmer....Kellogg talks about transferring information....".

"is a center of rural development...".

".the curriculum leaves little time for the students to be involved in PEC...".

"...some might express doubts about how the second year recruiting changed...". "...to go after the ones who can pay...".

"Anyone could lead the process who had enough huspa...".

"Sustainable agriculture..helping the communities..how to get credible? Time to discuss it? 25% of time to provide extension and continuing education..a concern..what have we done for community..the continuing education is doing some but not what our propaganda....".

"...If we had more discipline there would be more rich kids sent here by parents who want the kids straightened out...".

47

"I worry about employment for the graduates...".

" the director should do more fund raising..needs to spend more time looking to see what happens in the class room..".

"The faculty is very international....".

"The most important aspect of my course could be a place for the students to talk about the curriculum....".

"....hope that the bureaucratic things do not increase...".

"Prior to the beginning of E.A.R.T.H.'s program, some of the University students believed that E.A.R.T.H. was associated with an American plot to have contras trained and they did not want the University associated with such a gringo thing".

"...The mandate was for the school to always be international. The law was modified several times due to the political pressures".

"..The school gives a lot of emphasis on environmental issues....". "...If we plant cassava include laurel, and legumes, to think about how to incorporate a balanced system." "...to learn how to keep bananas and do a better job of not messing up the environment so"..

"..The percapita ag production is decreasing....". "...We have already lost some genetic potential and we won't be able to recover then. To take better care of the resources. The people have moved here with ag practices from other parts of....".

" one must refute the argument just to keep people out of the humid tropics but the reality is that people need to eat and will come into the area anyway..bananas are a source of foreign exchange..there are global concerns..debts, pop growth, although the past is of democracy..there has to be a balance in land distribution....".

"50% of students should come from low and medium income families. The recruitment concentrates on the rural schools in the region...".

"we would like to graduate 100%...".

"Monocultures with the exception of bananas are not in keeping with the humid tropics...".

"Changes have been made as the assumptions made about math and science were too high. Learning by doing will stay as will the integrated curriculum effort as will the emphasis toward the small farmer. The work experience..entrepreneurial experience and to be sensitive to the environment".

"There is an entry and an exit profile...".

"What skills do these folk need to graduate? They need accounting, to be able to talk in board meetings, to present proposals, and to be able to talk with small farmers and especially to listen. If need to know soils one must know ph levels and have that kind of chemistry...".

"Difference between the academic farm and the commercial farm is that the commercial farm must make money-hence the investment in the rail system..reduced the amount of number 2 bananas because the rail protects the bananas from bruising..they were getting 22% bruising before....".

"They are planning to plant about 9,000 more hectares of bananas near rivers here in Costa Rica--I feel the school has a role to help the country determine the risks involved in this decision".

"There was this big problem with physics...".

49

APPENDIX 2
THE CONCEPTUAL FRAMEWORK OF THE STRATEGIC METHODOLOGY.

The conceptual framework for the evaluation process has evolved from a number of initiatives in different parts of the world, each being informed by slightly different philosophical and theoretical propositions (Macadam et al 1989). At the heart of the process is a commitment to what has been referred to as **communicative action:** "that form of social interaction in which the plans of action of different actors are co-ordinated through an exchange of communicative acts, that is, through a use of language oriented towards reaching understanding" (Habermas, 1972).

In essence, the process involves sets of **critical conversations** between the evaluators-as-facilitators and those involved in the situations being evaluated. The conversations are envisioned as a form of collaborative learning -- communicative action -- which has the intent of exposing new insights and understandings about situations in such a manner that they will result in a motivation, by those directly affected by those particular situations, to improve them.

This process of participative inquiry is particularly relevant to the E.A.R.T.H. situation as it models the whole ethos of "participative learning" which that university espouses as central to its educational approach.

Three "schools" of theory are recognized as particularly useful in informing this methodology.

1.   Pluralistic Learning Theory

It is increasingly accepted that there are many ways by which we learn -- there is a pluralism of ways of knowing. Each has its own benefits as well as limitations. For the purposes of this present analysis, the distinction is made between three basic ways of learning:

> Propositional learning (learning for knowing)
> Practical learning (learning for doing)
> Experiential learning (learning for being or becoming)

In a rich learning environment, all three types of learning are utilized and indeed, are integrated to comprise what might be termed a learning system. Propositional learning concerns itself essentially with those theories and principles that have been developed by others and which are made available in one form or another to the learner, as propositions. With practical learning, the learner is concerned with knowing what to do and how to do it, in specific situations, again invariably relying on what has already been developed by others.

Experiential learning is somewhat different from the other two forms of learning identified here in that knowledge is uniquely created by the learner rather than "copied" from others.

Experiential learning can be defined as "that process by which we transform our personal experiences (in the world) into knowledge (of the world) in order to adapt (to the world or to adapt it to us)".

The process of transformation of experience into knowledge is extremely complex and involves, and is thus influenced by, a host of different dimensions including our abilities to sense and observe, to think and understand, to plan and create, and to critically reflect, as well as to take appropriate actions. Our beliefs, emotions, dispositions, competencies and past experiences also all contribute to the process of experiential learning. One of its most important attributes is that it provides a vehicle for us to learn about the process of learning itself, as well as about the nature of knowledge. These latter two aspects -- often considered as "higher levels of learning or cognition" -- are of fundamental importance in circumstances such as the present one where issues related to "learning philosophies and strategies" are central to the "business" of the organization being evaluated.

An evaluation which uses participative processes must perforce be experiential in nature. It will also draw heavily however, on both propositions and practices already "known" by the evaluators - theories which inform their practices, and the practices of the methodologies themselves.

2. Systems Theories

Systems theories are a set of propositions about the way the we believe that the world is organized (our ontologies); including the way by which we go about developing our knowledge of that organization!(our epistemologies) In other words, systems (or systemic) ways of learning about the world are based on certain assumptions about what is known about nature, as well as about the nature of the way that is known. Essentially these theories suggest that "whole phenomena" possess characteristics which are not identifiable through a study of their parts. Systems thinking and practices then, focus on interrelationships rather than on things, issues or events in isolation.

Systemic methodologies allow one to deal with complex phenomena like organizations, in ways which more conventional forms of analysis do not. In the case of the E.A.R.T.H. evaluation this approach has three major benefits. In the first place it allows the evaluators to build up an understanding of the complexity and dynamics of the organization itself and the way by which it interacts with its environments. In the second place it provides an opportunity to share with E.A.R.T.H. personnel, a methodological approach which has considerable relevance to the ongoing processes of organizational strategic development. And finally it provides opportunities for faculty to familiarize themselves with an approach which is entirely relevant to their espoused aims of learning how to develop more sustainable forms (systems!) of agriculture as responsible natural resource management -- and to "understand the interrelationship of agriculture with the social, economic, and natural environment"(E.A.R.T.H., General Information).

51

3. Organizational Theories

An integration of the two theoretical "schools" above, allows the development of a third perspective; one which relates particularly to the notion of the strategic development of an institution. Individuals within an organization can share their learning in such a collaborative way that the organization itself seems to develop a sort of corporate "learning culture".

In this manner it makes sense to refer to the organization concerned as a **learning system**. The effectiveness of the conversations within the institution about the way the institution is going about its business, becomes such, that it constitutes communicative actions.

In other words, by learning and sharing their insights and reflections together about the way they are going about developing the E.A.R.T.H. approach to education -- their educational **paradigm** -- the faculty are constituting their institution as a learning system. Of vital importance in this regard, are the linkages or connections that are being made between the institution and a large variety of its constituencies in the community which are relevant to its activities and indeed, its survival. This process can be conceptualized as a system linking with its environment in such a way that each is sensitive to, and influenced by, the other.

Effective learning systems are in co-evolutionary relationships with their environments.

This present evaluation would focus particularly on this metaphor of E.A.R.T.H. as a learning system in co-evolution with its environments and would fashion its methodology in ways which would encourage an appraisal of the performance of the system by those which comprised it -- again a notion in accord with the principle of **communicative action**.

APPENDIX 3
PEOPLE INTERVIEWED THROUGH THE EVALUATION

<u>USAID/Costa Rica</u>

Baucom. William, Supervisor Agricultural Development Officer
Fledderjohn. David, Project Advisor
Losk. David, General Development Officer
Loria. Miguel, Economist
Rodriguez. Heriberto, Engineer
Venezia. Ronald, Mission Director
Villalobos. Arturo, Agriculture Economist
Waddel. Ginger, Assistant Program and Evalulation Officer

<u>Consejo Nacional para Investigaciones Cientificas y Tecnologicas (CONICIT)</u>

Leon. Guillermo Arturo Vicente, Sub-Secretario Ejecutivo
Mora. William, Jefe de Oficina de Prensa y de Relaciones Publicas
Pena. Willliam, staff
Sibaja Educardo Arias, Secretario Ejecutivo
Ulote. Juan Carlos, Miembro de la Junta Directiva

<u>E.A.R.T.H. Escuela de Agricultura de la Región Tropical Humeda</u>

Alvarado, Edgar, Prof. Entomoloy
Arce, Jorge, Prof. Tropical Crops
Arias, Juan Antonio, Prof. Evolution and Genetics
Burgos, Carlos, Prof. Food, Agriculture, and Natural Resources
Chavez, Carlos, Dir. Continuing Education
Elango, Fritz, Prof. Plant Pathology
Flores, Bob, Cal Poly contract manager
Foster, Rick, University of Nebraska, Lincoln, staff evaluation
French, James, Dir. of Academic Affairs
Gomez, Tobias, Prof. Physical Education and Health
Hagan, Terry, Prof. English
Hernandez Herrera Carlos, Engineer
Lopez, Oldemar, Computer Center
Mata, Alex, Dir. of Finance
Molinari, Irio, Prof. Math and Student Affairs
Murillo, Carlos, Prof. Student Entreprise Projects
Rodriquez, Jorge C., Prof. Animal Production
Rodriquez, Lupita, Librarian
Sandi, Carlos, Forestry

Sherrard, Daniel, Prof. Orientation
Singh, B.K., Prof. Chemical Applications
Sorando, Luis, Public Relations, Outreach and fund-raising
Ulloa, Omar, Prof. Mechanical Skills
Umana Perez, Guillermo, Farm Manager
Vargas, German, Prof. Oral and Written Communication
Zaglul, Jose A. Director General

E.A.R.T.H. Students -- Belize, Bolivia, Brazil, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Nicaragua and Panama

E.A.R.T.H. Board of Directors and Trustees

Brown, Norman, Trustee & President of Kellogg Foundation
Cortes, Rodolfo, Trustee and First President of Directors
Dengo, Jorge Manuel, Director, Secretary and First acting E.A.R.T.H. Director
Fonseca, Hernan, Director and Secretary
Peralta, Manuel, Legal Advisor to Trustees

University of Costa Rica

Facultad de Agronomia

Arauz, Ing. Luis Felipe Ph.D. Professor of Fitopatologia
Soto, Ing. Adolfo, M.Sci-Dean

Centro de Investigaciones Agronomos

Gonzales, Miguel Director and former Dean of Ag.versity

APPENDIX 4
A CONTEXT FOR E.A.R.T.H.

Region

It is often stated that the humid tropics represent the last frontier for agricultural development, on earth. The humid tropics of the Americas run through 32 countries, comprise around 60% of the land mass of Latin America, and in its virgin state, would have been mainly forested. Much of this forest has now been cleared however, as agriculture, forestry and other human primary production activities have taken their inexorable toll on the natural resource base of the region.

Unless there are fundamental changes to this situation, the ecological future of the region looks bleak in the face of a human population growth rate of around 3% per annum -- one of the highest regional rates in the world.

Herein lies the essential challenge to E.A.R.T.H.: "If we do not protect our resources, we may never be able to recover or repair the damage inflicted (on the environment of the humid tropics) thus endangering the very source of food production and in turn the life of our peoples" (Dr. Jose Zaglul, 1991).

Agriculture

In a relatively recent publication, Leonard (1985), highlights a basic contradiction facing the countries of Central America: On the one hand the entire region is going to have to place an increasing reliance on accelerated rates of production from basic natural resource systems, whilst on the other hand, these very systems are already being severely over-exploited to the point of "resource exhaustion" through poor management. While this submission was made in a general sense to cover all of the agro-ecological zones of the region, it has a particular importance for the humid tropics, where stable systems of agriculture or grazing management, are notoriously undeveloped.

This important report also presents data which highlight enormously significant changes which have occurred in land use patterns in the region over the past thirty or forty years. In this context, three particular socio-economic forces are recognized as having played profound roles.

- The continuing need for more land in production in response to the inexorable and explosive rate of human population growth, and the generally poor rate of productivity growth of land already in production.

- The huge increases in cattle production, in response to both international market forces and the stimulation of financial assistance provided by international

development agencies, and which by the mid-eighties involved more than half of the best land in the region.

* Impressive advances in both human medicine and in technologies which have allowed previously inaccessible lands to be developed. This is particularly so on the plains of the Pacific coasts of the countries of the region, and in the river catchments which empty into the Caribbean Sea - the humid tropics in each case!

And all of these must be set in the context of the continuing political and social instability, of insurgency and transmigrations, of economic uncertainties and instabilities, of high human population growth rates, of high levels of poverty, disease incidence and low nutritional standards, and of frequent natural disasters of earthquakes, volcanic eruptions and viscious storms!

From this it can be concluded that the intensification of agricultural production in Central America, and especially in the humid tropic zones, has not been achieved without severe environmental penalties.

* Very significant extent of deforestation (with the persistence of high rates of forest loss of around 3.0% per annum) and the associated local and global consequences.

* Extensive areas of soil erosion -- where up to 40% of the land in the humid tropical zone along the Pacific Coast, is already suffering depressed production as a result.

* Serious loss of soil fertility, through poor management of the "fragile" soils of the humid tropics, and where the result has often been the abandonment of the land for agricultural purposes almost immediately after it has been "opened up". Under some circumstances this has resulted in secondary forest growth, the major portion however has been left as bare soil exposed to the elements and serious erosion and leaching has resulted.

* Extensive deterioration of river catchment areas, especially in the humid tropic zones, which was triggered in the first place by acute deforestation. This has resulted in very extensive erosion of soil and its associated siltation pollution of rivers and of the ocean at the river mouths. This classical environmental degradation situation reaches a position of irreparable involution when the damage is so severe that the hydrological cycle is permanently affected.

Not surprisingly, there is generally a clear correlation between the density of human population in any country and the extent to which the land of that nation is degraded. As Table 1 illustrates, the greatest damage to the environment in Central America has occurred where the population is at its densest (in El Salvador where more than 5 million people are living on a continental area of only 21 thousand square kilometers). With the clear exception

of Panama, the rest of the countries of the region, show a clear trend in this correlation between the extent of human activities and the degradation of the land.

TABLE 1:
Relationships Between Land Degradation and Population Density in Central America

	Percentage of land eroded or degraded	Density of human population (per square km)
El Salvador	45	246
Guatemala	25-35	79
Panama	17	29
Costa Rica	17	53
Honduras	7	41
Nicaragua	5-10	28
Belice	1	7

- Abuse of pesticides which has reached serious proportions in large parts of the region resulting in serious hazards both directly and indirectly to public health as well as to biota in general. This problem is being accentuated by the introduction of a new fixed transport system in the massively extensive banana plantations in the region; these expensive infrastructures extend the life of the plantations very considerably, and this necessitates much more intensive pesticide usage in lieu of rotation of enterprises.

In spite of all of these issues of environmental abuses however, many attempts at intensification of agriculture have been successful in the humid tropics especially where multiple cropping and integrated farming systems have been developed.

It is now generally accepted that systems of farming for the humid tropics need to take account of the unusual complexity and dynamics of life systems in this zone.

Population Dynamics and Socio-Economics

The human population of Central America passed the 25 million mark in 1986 and this represented a fivefold increase in less than 70 years. With individual national population rates growing at between 2.1% and 3.4%, the region faces the prospect of having a total

human population in excess of 40 million by the turn of this century.

As a very significant proportion of the current population lives under conditions of severe poverty, the economies of the various countries in the region will have to show almost miraculous rates of growth if situations are to improve.

In 1985, Leonard quoted the following estimations for the percentage of the rural populations of the countries in the region, who were living in absolute poverty:-.

TABLE 2:
Percentage of rural people estimated to be living under conditions
of severe poverty in specific countries of Central America

Guatemala	60%
Belice	NA
El Salvador	70%
Honduras	77%
Nicaragua	57%
Costa Rica	40%
Panama	55%

Given that roughly half of the population of the entire region still live in rural areas, many millions of Central Americans continue to live with the daily threat of severe malnutrition and undernutrition. Typically these are people who are either landless laborers or are families living on extremely small and marginal landholdings where they are barely able to achieve subsistence.

Land Tenancy in the Region

Very significant differences in patterns of tenancy and land utilisation are found across the Central American isthmus. This has most significant implications when the roles of agricultural graduates are discussed in the context of the entire region.

The agriculturist of tomorrow in this region, will have four target constitutencies:

• the large, export-oriented estate sector, the main function of which is to generate export revenue for the countries of the region, which typically will continue to rely heavily on such revenue sources for many decades to come. These "fincas multi-familiares" provide income not only for their owners and managers but also for substantial labor forces, at least periodically, and for the extensive commercial and

public support services which they typically utilize.

- the medium to small farmer sector, the main function of which is to assure security of food for the respective nations. The "fincas familiares" provide satisfactory standards of living for the members of the family who provide the labor as well as the management. These also typically utilize the services of private and public support services.

- the small subsistence farmers, who invariably constitute the major part of the "farming population" but, equally typically have access to the smallest area, and usually poorest quality of land. The "fincas sub-familiares" are regarded as those which provide for the barest standard of living for those who own or work them.

- the extensive, state-owned natural resources, such as forests and parks, as well as natural geomorphological features, such as catchment areas, which all demand increasingly specialized management.

No responsible agricultural university can concentrate its efforts exclusively on any one of these four constituencies; but must attempt to serve all four while being acutley aware of the sensitve interrelationships between them. The basic challenge then, is to help rural people to "learn their way through" new, ever-changing and complex situations, and where the basic limitations are the capacities of people to change their ways of knowing - agricultural scientists, agribusinessmen and peasants, alike.

Higher Education

Higher education has a long history in Central America and agriculture has been available as a field of study at the undergraduate level for many decades. There are increasing concerns however that the conventional paradigms of agricultural education are inadequate in the context of the responsible management of natural resources, especially when the complex issues as illustrated above, are considered.

Region (Humid Tropics)

E.A.R.T.H. is the only institution of higher education in Latin America and the Caribbean, whose mission it is to provide an undergraduate education focusing on sustainable agriculture in the humid tropics. The school that is mentioned most frequently as being similar to E.A.R.T.H. in terms of its approach to "learning by doing" -- aprender haciendo -- is Zamorano in Honduras. Zamorano however, emphasizes the arid tropics and does not subscribe to what might be termed "an ecological approach". Both E.A.R.T.H. and Zamorano grant a four year B.S. degree.

Costa Rica

64

Within Costa Rica specifically, agriculture degrees are given by three state schools, the University of Costa Rica, the National University, which also has a school of Veterinary medicine and the Technological Institute. A master's degree is the highest agricultural degree given by any university in the country. A private technological university (undergraduate) which is funded in part by Great Britain, Centro Americana de Ganaderia (American Cattle Center) is said to use a process of "learning by doing" with a focus exclusively on cattle.

CATIE (Centro Agronomico Tropical de Investigacion y Ensenasa) provides education on the humid tropics at the master's degree level. Although originally begun as an operation of the Organization of the American States (OAS), CATIE now receives approximately half its financial support from the government of Costa Rica. CATIE and the Organization for Tropical Studies (OTS) have both signed agreements with E.A.R.T.H. to share facilities and technical assistance. OTS is a consortium of seven universities to help facilitate the study of the environment. Books from the CATIE library are frequently used at E.A.R.T.H. as are laboratory materials. Other agreements have been signed with CINDE (Coalicion Costarricense de Iniciativas) the National University and the National Banana Corporation, (CORBANA) for technology transfer.

APPENDIX 5:
CAL POLY STATEMENT OF WORK - PHASE II

I.   Organization of College (Counterpart: Director General)

TASK 1: General Assistance: Provide a Resident Chief of Party.

TASK 2: Prepare a Detailed PERT Chart.

TASK 3: Assist with Defining the Administrative Organization, Administrative Interrelationships and Functions, and Developing an Organization Chart.

TASK 4: Assist with Defining the College's Relationship with the Board of Directors and Board of Trustees.

II.   Academic Program (Counterpart Academic Coordinator)

1.   Student Recruitment

TASK 5: Assist with the Establishment of Student Admission Policies.

TASK 6: Prepare a College Catalog for the 1990 Academic Year and assist with Updating the College Catalog.

TASK 7: Assist with the Preelection of Students and Notification of Preselected Students.

TASK 8: Assist with Interviewing and Testing of Preselected Students.

TASK 9: Assist with the Final Selection of Students, Including Follow-Up Activities.

TASK 10: Assist with the development of a Long-Term Student Recruitment Plan

2.   Faculty Recruitment

TASK 11: Assist with the Preparation of Position Descriptions for First Year Faculty Requirements.

TASK 12: Assist with the Preparation of Position Announcements, Publication and Mailing List of First Year Faculty Requirements.

61

TASK 13: Assist with the Final Selection of First Year Faculty and Other Staff as Necessary.

TASK 14: Assist with the Development of a Recruitment Plan for Second Year Faculty Requirements.

TASK 15: Provide Faculty Colleagues and Temporary Faculty.

TASK 16: Provide In-Service Training for Administrators, Faculty and Staff.

TASK 17: Assist with the Development of a Long-Term Faculty Recruitment Plan.

3.   Scholarship and Financial Aid Plan

TASK 18: Assist with the Development of a College Outreach Plan.

TASK 19: Prepare a Plan for a Student Scholarships, Financial Aid and Loan Plan.

TASK 20: Assist with Defining the Content of Scholarships.

4.   College Policies and Procedures

TASK 21: Assist with the Refinement of Personnel Policies for Faculty and Other Academic Support Staff.

TASK 22: Assist with the Development of a Handbook for the Administration of the Faculty.

TASK 23 Assist with the Development of Personnel Manuals.

TASK 24: Provide a Student Handbook, Including Student Life.

TASK 25: Prepare a Plan for the Administration of the Faculty.

TASK 26: Assist with the Development of Research/Extension Guidelines.

5.   Curriculum and Schedule of Classes

TASK 27: Help Plan, Develop and Establish a Four-Year Curriculum.

TASK 28: Correlate E.A.R.T.H.'s Curriculum with the Traditional-Type Curriculum.

67

TASK 29: Prepare a College Accreditation Plan.

6. Evaluations

TASK 30: Assist with the Development of a Self-Evaluation Plan.

TASK 31: Assist with the Development of an External Evaluation Plan.

7. Other

TASK 32: Prepare a plan for the Development of the College's Computer System.

TASK 33: Assist with Providing a List of Texts and Periodicals Required for the college Library.

TASK 34: Design Student Work Stations.

TASK 35: Develop a Master Plan for the Academic and Commercial Farm.

TASK 36: Assist with the Development of Facility Use and Maintenance Policies and Procedures.

TASK 37: Assist with the Development of a Policy to Attend to College Visitors.

III. Financial Aspects (Counterpart: Financial Administrator)

1. Operation of the College

TASK 38: Assist with Defining Financial Operation Requirements.

TASK 39: Assist with Developing Financial Control Systems with Grantees.

TASK 40: Assist with Developing and Establishing an Accounting and Financial Reporting System.

TASK 41: Assist with Developing Controllership Functions.

TASK 42: Assist with Developing Regulatory Functions,including Establishment of systems and Procedures.

2. Internal Controls

TASK 43: Assist with Developing Yearly Budgets, including Control of Budget with Actual Expenditures.

TASK 44: Assist with Developing Recommendations for Controlling Expenditures and Maximizing Financial Efficiency.

TASK 45: Assist with Developing an Inventory Control System.

TASK 46: Assist with Developing a Disposal of Goods Policy.

3. Student Relations

TASK 47: Assist with Establishment of Payment Procedures for Tuition.

TASK 48: Assist with Developing a Plan/Procedures for Conversion of Foreign Currencies Raised for the College into U.S. Dollars.

4. Financial System

TASK 49: Assist with Updating Financial Projections and Controlling Results with Actual Expenditures.

TASK 50: Assist with Developing an Investment Plan for the College.

5. Commercial Farm

TASK 51: Assist with the Development of Organizational functions and Organization Chart for the Commercial Farm.

TASK 52: Assist with the Interpretation of Results and Definition of New Project.

6. Management Information System (MIS)

TASK 53: Help Establish a Fund Accounting System

TASK 54: Assist with the Establishment of a Systems Information for Payroll and Inventory.

IV. Administration (Counterpart: Financial Administrator)

1. Policies and Manuals

TASK 55: Assist with the Establishment of a Personnel Policy for

64

Administrative Staff.

· TASK 56: Assist with the Development of a Handbook for Administrative Staff and Support Personnel.

TASK 57: Assist with the Description of Positions and Position Evaluations.

2. Systems

TASK: 58: Assist with the Development of a Procurement Manual and Procure Goods.

A. Procurement System
B. Procurement of Goods

3. Housing

TASK 59: Assist with the Preparation of a Housing Manual for Faculty and Students.

TASK 60: Assist with the Development of an Incentive Plan to Promote Off-Campus Living for Faculty and Staff.

V. External Relations (Counterpart: General Director)

TASK 61: Develop an External Relations Plan including a Position Description of an External Relations Coordinator.

VI. Continuing Education Center (Counterpart: Academic Coordinator)

TASK 62: Assist with the Preparation of a Plan for the Development of the Continuing Education Center.

VII. Environmental Assessment (Counterpart: Academic Coordinator)

TASK 63: Provide an Updated Environmental Assessment Plan.

VIII. Architectural Design (Counterpart: Project Manager, Chief Engineer)

TASK 64: Provide Advice with Architectural and landscaping Design.

IX. Pool of Consultants (Counterpart: Director General)

TASK 65: Provide a Contingency Pool of Consultants.

X.   Management of the Support University Contract

   TASK 66: Provide Management of the Support University Contract.

APPENDIX 6:
LONG-TERM VIABILITY OF E.A.R.T.H.

EXECUTIVE SUMMARY

Financial viability for E.A.R.T.H. at least through 1999 is reasonably attainable, including maintenance of an endowment at approximately the $60 million level (expressed in current dollars). The E.A.R.T.H. endowment by the year 2,000 will be approximately the same as projected at the time of the Project Paper.

The E.A.R.T.H. endowment funds (local currency and foreign exchange) are, by themselves, insufficient to ensure E.A.R.T.H.'s viability for an extended period (e.g., 10-20 years) beyond the life of the A.I.D. grant period (ending 1995). The endowment funds are sufficient to be the principal resource upon which E.A.R.T.H. may rely in maintaining its viability. By 1995, at least one-third of E.A.R.T.H.'s recurring costs will be obtained from endowment earnings. Other (non-endowment) revenues will come from school operations (cost controls, student payments), farm operations and other market-based activities, service contracts, and -- to a heavier degree than originally projected -- from unrestricted and restricted grants from sources other than A.I.D.

The evaluation team defines E.A.R.T.H.'s viability as its financial and managerial capacity to sustain and improve the quality of faculty, student body, facilities, relationships and activities required to fulfill its mission. This definition of "viability" goes beyond strictly financial parameters and acknowledges an interrelationship of E.A.R.T.H.'s financial and human resource base. For E.A.R.T.H. to be viable, it must be effective and relevant (i.e., valued by resource holders) at a sufficient level to generate the resources it will require beyond that available through the endowment.

The evaluation team concludes that E.A.R.T.H. has exercised prudent and effective stewardship over the resources that have been committed to it with a view to enabling E.A.R.T.H. to have long-term viability. E.A.R.T.H. is currently viable, and its financial viability for up to ten years beyond the life of this Project can reasonably be predicted.

SCOPE OF WORK

The evaluation Scope of Work calls for the following analyses and assessments bearing on E.A.R.T.H.'s long-term financial viability:

1. Verify the accuracy of revenues and expenditures projected for E.A.R.T.H. for the period 1990 to 1999;

2. Assess yearly earnings likely to be generated by the endowment fund for the period 1990 to 1999 to help the board of Trustees determine the level of funds to be provided to E.A.R.T.H. This assessment should consider minimum and maximum levels of revenues and expenditures allowing for economic uncertainties.

3. Examine and comment on the assumptions used in financial projections.

4. Test the validity of calculations prepared by E.A.R.T.H. in projections to date.

METHOD

The evaluation team:

(a) Reviewed all USAID/CR files pertaining to E.A.R.T.H. structure and finances, from commencement to date.

(b) Interviewed E.A.R.T.H. management, Directors, Trustees, and legal counsel.

(c) Reviewed E.A.R.T.H. financial analyses, reports, and projections. This included copies of materials, with backup and supporting documents, regularly provided to management, Directors, Trustees, and A.I.D.

(d) Worked on a close, collaborative basis with E.A.R.T.H.'s Financial Director (Alex Mata) to examine the validity of E.A.R.T.H. financial projections and to test hypotheses on future levels of revenues required and likely to be available.

The evaluation team notes, with thanks, the very high level of openness, cooperation and assistance provided by E.A.R.T.H. and USAID/CR in the course of this assessment of E.A.R.T.H.'s financial viability.

68

I.   Findings

A.   Design assumptions concerning financial viability

The Government of Costa Rica (GOCR) and the Agency for International Development (A.I.D.), through its Mission in Costa Rica (USAID/CR), entered into a Memorandum of Understanding on November 7, 1984 for the establishment of E.A.R.T.H. This agreement was executed by the President of the Republic and the USAID/CR Mission Director. It provided that the school would be operated as a non-governmental entity, with inaugural funding to come from economic stabilization and recovery funds as per the USAID/CR-GOCR Trust Fund agreement of February 21, 1984 (Project 515-0192).

Detailed design efforts were undertaken in 1984 and 1985 by USAID/CR and the A.I.D. Regional Office for Central America and Panama (ROCAP). These design efforts, including commentary and recommendations by A.I.D./Washington, are set forth in the Project Paper dated August 23, 1985. Project funding, as provided in the Project Paper (p. 71), was set at a total of $26.4 million in dollar costs and $89.3 million in local currency costs. The Project Paper commented as follows on the financial plan (pp. 70-72):

(a)   "The project is designed to finance all dollar costs of the college for a ten-year period for two reasons: first, achieving the objective of creating a new institution requires a longer implementation period than the five years normally associated with A.I.D. projects; and second, the extended period of support will provide the college with additional time to develop and capitalize a dollar endowment from other sources which, after the A.I.D. assistance ends, will be available to provide dollar income on a continuing basis. For the first 10 years, therefore, the project will finance all dollar costs ($26.4 million) so that all other dollar income coming to the college will go to the endowment."

(b)   "The local currency funding will consist of two parts: (1) resources to meet start up costs associated with the purchase of land, construction of physical facilities and purchase of equipment available on the local market; and (2) resources to capitalize a local currency endowment which will generate income to cover operating expenses that can be financed with local currency. The total local currency required will be approximately $89.3 million equivalent, broken down between land ($8.5 million), construction ($19.0 million), equipment ($1.8 million), and other expenses ($0.3 million) and the endowment ($60.0 million)."

The Project Paper provided (pp. 71, 73, and Annex II.B.9) that the $60 million endowment would be capitalized in a two parts: a local currency fund of $50 million and a dollar endowment of $10 million.

69

B.	Implementing agreements affecting financial viability

The structure and mechanisms for providing and managing E.A.R.T.H.'s financial resources were established over the period 1985-1989 in a series of agreements, the principal ones being:

(1)	Project Grant Agreement, USAID/CR and GOCR, September 30, 1985

(2)	Trust Agreement, USAID/CR and E.A.R.T.H. Trust, March 12, 1987

(3)	Implementation Agreement, GOCR and E.A.R.T.H., May 22, 1987

(4)	Local Currency Grant Agreement, USAID/CR and E.A.R.T.H., August 22, 1987

(5)	Cooperative Agreement, USAID/CR and E.A.R.T.H., August 29, 1989.

These agreements are discussed below.

Project Grant Agreement:	On September 30, 1985, USAID/CR and the GOCR entered into the Project Grant Agreement to establish and fund E.A.R.T.H. as a non-governmental school. A.I.D. agreed to a total dollar commitment of $26.4 million, to cover foreign exchange and local currency costs. The GOCR in turn committed to provide "not less than the equivalent of US $89.65 million", to be provided from local currency available under the A.I.D.-funded Economic Stabilization and Recovery (ESR) program.

Annex I to the Grant Agreement (incorporated by reference into Section 2.1 of the Agreement) included the following provisions (in Section III.(e) concerning the endowment:

"A major objective of the Project is to assure the long-term viability of the College. To achieve this objective, an endowment will be created consisting of both local currency and dollars.

"The local currency portion of the endowment will be funded with the local currency equivalent of $50.0 million to be provided from the ESR program between A.I.D. and the GOCR. This endowment will generate income to cover those operating costs which can be paid in local currency (e.g., salaries of local staff, 25% of salary costs of foreign staff, maintenance, equipment, etc.).

"The dollar portion of the endowment will be established by the College over the first four years of the Project. To fund this part of the endowment, the Central Bank of Costa Rica (BCCR) has agreed to convert into dollars each year for four years the local currency equivalent of $2.5 million, also made available under the ESR program, for a total dollar amount of $10.0 million. Income earned by this part of

APP-6-4

the endowment will help cover dollar operating costs of the college."[1]

As provided in the Grant Agreement, the GOCR on September 29, 1986 enacted Law 7044 creating E.A.R.T.H. as a private educational and research institution for public purposes, with specialization in teaching, research, and dissemination of agricultural knowledge and the conservation of the humid tropics.

The Trust Agreement: On January 6, 1987, Fiduciaria de Educacion Agricola del Atlantico, S.A. (the "Trust") was created under Costa Rican laws. On March 12, 1987, the Trust and USAID/CR entered into a Trust Agreement whereby the Trust would exercise stewardship over the E.A.R.T.H. endowment funds and otherwise serve as a channel for USAID/Cr and GOCR financing for E.A.R.T.H.

[Note: Subsequent to the March 12, 1987 Trust Agreement, a series of Conveyance Agreements were executed by USAID/CR and the Trust covering conveyance of funds for the endowment. Of particular relevance is Conveyance Agreement No. 4, September 27, 1984, concerning funds establishing the $10 million dollar endowment fund. While the Project Paper, the 1985 Project Grant Agreement, and the 1987 Implementation Agreement had provided for capitalization of the dollar endowment in addition to capitalization of the Colon endowment, this Conveyance Agreement No. 4 provided that the dollar endowment would be derived from earnings on the Colon endowment. Thus, the E.A.R.T.H. endowment capitalization was $10 million less than the amount upon which design estimates of long-term viability had been predicated.]

Implementation Agreement: Through an Implementation Agreement dated May 22, 1987 between the GOCR and E.A.R.T.H., the GOCR transferred to E.A.R.T.H. all of the Government's rights and responsibilities to implement the project as described in the September 30, 1985 Grant Agreement. This 1987 Implementation Agreement established E.A.R.T.H. (via the Trust) as the direct recipient of the Grant disbursements by A.I.D. under the 1985 Grant Agreement.

The May 22, 1987 Implementation Agreement incorporated by reference the Annex I, which had accompanied the 1985 USAID/CR Project Grant Agreement with the GOCR, including the following description, derived from the Project Paper, of the Project's financial plan:

"The proposed dollar budget is for $26.4 million in USAID dollar resources.

"The total local currency budget provided through the ESR stabilization program will be $89.6 million in local currency equivalent. This will be disbursed for the project

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[1] The BCCR agreement to convert is contained in a letter of 13 May 1985 from the BCCR Gerente General to the USAID/CR Mission Director.

as follows:

> 1) $60 million in local currency equivalent to fund the endowment discussed in Section III.e above.
>
> 2) $29.6 million in local currency equivalent for capital expenses."

Local Currency Grant Agreement: On August 22, 1987, the GOCR, USAID/CR, and E.A.R.T.H. entered into a Local Currency Grant Agreement to give monetary effect to the May 22 Implementation Agreement. Under this August 22 Agreement, USAID/CR and the GOCR transferred Project funds to E.A.R.T.H. (via the Trust), to be maintained in a separate bank account with Banco Central de Costa Rica, with the funds invested in Monetary Stabilization Bonds.

Foreign Currency Grant Agreement (Cooperative Agreement): On August 29, 1989, E.A.R.T.H. and USAID/CR entered into an A.I.D. Handbook 13 Cooperative Agreement (No. 515-1029-A-00-9722), replacing and subsuming the provisions of the September 30, 1985 Project Grant Agreement with respect to foreign currencies (dollars) for the Project.

C.   Roles and responsibilities for financial management

The responsibilities for management of E.A.R.T.H.'s financial resources are divided among three main groups:

> --   The Trustees (members of the Board of Fiduciaria de Educacion Agricola del Atlantico, S.A.) exercise stewardship over the local currency and endowment funds of E.A.R.T.H. This stewardship includes management (through retained counsel/administrator, advisors, and investment agencies under contract) of the local currency and dollar portfolios. The Trustees also manage the local currency funds originally granted by USAID/CR to the GOCR and then transferred to E.A.R.T.H. by the 1987 Implementation Agreement. Through an established budget review process, the Trustees review the E.A.R.T.H. annual budget and distribute Trust proceeds to E.A.R.T.H. within the terms and limitations of the Trust Agreement.

> --   The Board of Directors of E.A.R.T.H.[2] exercises indirect stewardship of the financial resources through the Directors' oversight of overall E.A.R.T.H. management and internal controls concerning funds received from the Trust. The Directors bear ultimate responsibility for E.A.R.T.H.'s proper

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[2] There is interlocking membership of the Boards of Trustees and Directors although the majority of each body is independent of the other.

management and use of A.I.D. funds provided through the August 1989 Cooperative Agreement.

--   E.A.R.T.H. senior management, and particularly the Director General and the Director of Administration and Finance, have responsibility for planning/budgeting, cost controls, internal controls, and other related fiscal management functions. While the Board of Directors and the Trustees have access to independent advisors and counsel, the E.A.R.T.H. management plays the principal role of advising the Directors and Trustees on financial needs and experience of the school in operation. The 10-year financial projections (1990-1999) which are the focus of examination of E.A.R.T.H.'s long-term viability are the product of E.A.R.T.H. management efforts.

In addition to financial management, the Trustees, the Directors, and E.A.R.T.H. management have a shared commitment to an active role in seeking additional revenues for E.A.R.T.H. school operations and the endowment funds. The strategies and plans for Trustee or Director involvement in fund-raising are not yet fixed. However, E.A.R.T.H. has established and staffed (as of November 1990) a fund-raising office, and formulated a five-year (1991-1995) fund-raising campaign, focussing initially on securing scholarship funds.

In 1989 and 1990, several of the Directors and Trustees, in association with E.A.R.T.H. staff and with assistance from the W.K. Kellogg Foundation, established a non-profit organization in the United States named "Friends of the School of Agriculture of the Humid Tropics Region, Inc." This is commonly referred to at E.A.R.T.H. as the "Amigos" organization. Amigos secured its United States tax exemption in July 1990. As of the time of the evaluation (July 1991), arrangements had been made to secure part-time staffing for Amigos under the aegis and sponsorship of the Kellogg Foundation, commencing September 1991. An initial task for the Amigos group would be formulation of a specific strategy and plan for fund-raising efforts, and coordination of efforts with those of E.A.R.T.H. staff.

D.   Start-up financial experience: comparison with design

1.   Introductory comments

The objective of the financial assessments in this evaluation is to judge the prospects for E.A.R.T.H.'s long-term viability. Thus, the review of financial experience in this report concentrates on operational and recurring costs rather than on start-up capital costs.

The evaluation is also tasked with comparing E.A.R.T.H.'s financial experience with the design premises, to test the continuing validity of Project assumptions about long-term viability of the school.

The A.I.D. funding of E.A.R.T.H., including capitalization of the dollar and local currency endowments, extends over the 10-year period from 1986 through 1995. While 1990 marked the half-way point in the Project, and thus serves as a logical point for comparison of actuals with original projections, recognition must be given to the following:

(a)   According to the Project design, the $50 million local currency endowment was to be capitalized in two even installments in 1986 and 1987, and the $10 million foreign currency endowment to be capitalized in four equal installments over the period 1986 through 1990; however, capitalization of the local currency endowment did not commence until 1987, and the dollar endowment was not capitalized until 1989-1990, out of earnings on the local currency endowment.

(b)   The Project design projections reflected in the 1985 Project Paper had assumed commencement of classes in 1987; because of delays in securing legal standing for E.A.R.T.H., the first classes did not commence until 1989. As of the time of the evaluation (July 1991), the school was in its second full year of operation whereas the design projections had the first graduating class in 1991.

2.   School operations

For calendar year 1990, E.A.R.T.H. had operating expenses of just over $2 million dollars.[3] Its revenue from sources other than A.I.D. (tuitions and rentals[4]) amounted to $209,500, so

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        [3] Except where the context requires specification, this report will usually refer to US$ equivalents even though the actual currency may have been Colones.

        [4] As discussed below, E.A.R.T.H. "income" is recognized in the year expensed. Thus, farm income, interest, or non-A.I.D. grant money received in one year is not identified as "income"

74

the A.I.D. operating expense funding ($1.8 million) amounted to 89.75% of the total.

The Project Paper had projected that by 1990 (at full operation), operating expenses -- expressed in current dollar equivalents -- would be some $4.1 million, of which some $2.5 million would be from sources other than A.I.D. (i.e., tuitions, farm revenues, and other grants). The Project Paper also assumed that by 1990 E.A.R.T.H. would draw upon some $1.2 million in Colon endowment earnings, so that the operating deficit to be made up by A.I.D. grant funding would be only $400,000.

[Note: Projections over the 1990s are reviewed below with the conclusions in Section II. E.A.R.T.H.'s projected operating expenses for 1992, when it would be in full operation, are $4.9 million, expressed in current dollars; this compares with the Project Paper's projection of $5.19 million operating expenses in 1992. While this comparison is quite crude, it does suggest that from the standpoint of expenses, E.A.R.T.H. is reasonably in line with the design assumptions.]

3.   Endowment status

At the end of 1990, the total funding in E.A.R.T.H.'s endowment accounts (local currency and dollar denominated) amounted to $59.5 million. The Project Paper design had projected that as of this point the total endowment funding would be $71.8 million. The breakdown between local currency and dollar endowments, comparing actual with Project Paper projections, is as follows:

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As of 12/31/90:

	Actual	Project Paper
Dollar Endowment	$11,450,000	$16,157,000
Colon Endowment	48,081,000	55,597,000
Total Endowment	$59,531,000	$71,754,000

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until it is applied to expenses.

4.   Factors affecting long-term viability

The March 1991 A.I.D. Regional Inspector General audit of E.A.R.T.H. determined that the financial standing and viability of E.A.R.T.H. is uncertain in light of delays in commencing school operations as in light of economic fluctuations greater than anticipated at time of design. Our evaluation findings on the implications of delay in school start-up -- as well as delay and short-fall in endowment capitalization -- are reviewed above.

Other design premises now questionable (or even refuted) by experience include the following:

(a)   The Project Paper projected expenses and revenues on a current Colon/dollar basis, assuming an inflation rate of 5%. While this assumption was reasonably valid in the first few years of the Project, the actual inflation rate in Costa Rica in 1989 was 9.95% and in 1990 reached 27.25%. Thus, the Project Paper projected real interest earnings on the endowment in the range of 5% whereas actual experience has been that the E.A.R.T.H. endowment's real earnings are in the range of 1.5%.

(b)   The Project Paper (see Annex II.B.9) projected E.A.R.T.H. earnings from its farm operations based upon experience of the agricultural school at Zamorano, Honduras, with scenarios of farm revenues ranging from 25% to 50% of operating costs; these assumptions led to Project Paper projections of farm revenue contributions to school operations in excess of $1 million annually as of 1990. The actual experience has been that net farm revenues in 1990 were scarcely more than $250,000; they are projected by E.A.R.T.H. over the next 10 years to run at about 30% of the levels relied upon in the Project Paper calculations.

The evaluation team's determinations on the extent to which E.A.R.T.H. can be viewed as viable beyond the period of A.I.D. grant funding, notwithstanding the challenges to the original design assumptions on viability, are reviewed below in Section II.

II.   Conclusions Concerning E.A.R.T.H.'s Viability

[Note on report format: While A.I.D. evaluations typically distinguish between findings and conclusions, the principal assessment in this evaluation -- concerning projections for the future -- makes it difficult to distinguish neatly between findings and conclusions. The "findings" in Section I relate primarily to experience to date. The "conclusions" concerning projections in this Section inevitably incorporate some findings or conclusions not separately treated in Section I.]

A. Introductory Summary

E.A.R.T.H. has received from USAID and the Government of Costa Rica substantial capitalization for land, facilities, and for Colon and dollar endowments. E.A.R.T.H. has exercised prudent and productive stewardship over the capital resources entrusted to it, and has risen to the challenges presented by changes in circumstances and conditions at variance with the initial Project design assumptions.

E.A.R.T.H.'s capital resources -- including its endowments -- will be a significant element of E.A.R.T.H.'s future viability but they will not, in and of themselves, guarantee E.A.R.T.H.'s future. Long-term financial viability is attainable by E.A.R.T.H. But E.A.R.T.H.'s viability will be a function not just of its management of financial resources but also of E.A.R.T.H.'s ability (a) to manage risk as well as (b) its continued effectiveness and relevance as an institution warranting future support.

The evaluation team's definition of E.A.R.T.H.'s viability acknowledges an interrelationship of E.A.R.T.H.'s financial and human resource base.

B. Elements of E.A.R.T.H.'s Future Viability

A Project objective of institutional viability for E.A.R.T.H. can be inferred from Project design and related implementing documents even though the 1985 Project Paper does not, in its description of Project purpose (at pp. 28-35) or in the logical framework matrix (Annex I.B) explicitly go beyond "establishment" of E.A.R.T.H. as an intended end-of-project result. The financial analyses summarized in the Project Paper (pp. 48-50, 70-74) and detailed in appendices (Annex II.B.3 and II.B.9) define financial viability as ability to meet recurring costs from the local currency and dollar endowments.

The evaluation team believes that while any definition of E.A.R.T.H.'s sustainability or viability must ultimately address the bottom-line issue of sufficient income to meet essential expenses, it is neither possible nor appropriate to predicate future viability strictly upon guaranteed earnings from the school's cash endowment. Thus, the evaluation team believes that the Project design tended to equate "viability" with "survivability". The evaluation team suggests that "viability" be viewed on a somewhat broader, and more qualitative basis, that strict survivability.

The evaluation team concludes that E.A.R.T.H.'s long term sustainability implies relevance, effectiveness, and viability. E.A.R.T.H.'s viability should be and will be a function of its effectiveness and relevance:

-- "effectiveness" is E.A.R.T.H.'s capacity to maintain an institution of leaning in fulfillment of its defined mission;[5]

-- "relevance" is E.A.R.T.H.'s <u>valuation</u> by society (local, national, regional, global) at a sufficient level to provide the human, financial, and political resources required to be effective;

-- "viability", then, can be defined as E.A.R.T.H.'s financial and managerial capacity to sustain the quality of staffing, student body, facilities, and activities required to fulfill its mission.

Clearly, some form of institution can "survive" on the basis of the assets possessed by E.A.R.T.H. Thus, at present E.A.R.T.H. must be deemed to be viable. However, in order for E.A.R.T.H. to remain viable over the long term, it will require a capacity to be effective and relevant, as defined above. The evaluation team concludes that development and maintenance of this capacity is attainable by E.A.R.T.H.

C.   Projections of E.A.R.T.H. viability

E.A.R.T.H.'s Directors, Trustees, and management, as well as USAID/CR, have over the past two years examined E.A.R.T.H.'s future viability within the framework of ten-year projections developed by E.A.R.T.H. management in 1989. These projections have been updated from time to time, and were further reviewed and revised -- to incorporate most recent experience and circumstances -- during the course of this evaluation.

The basic structure of the projections is as follows:

-- expenses are projected, based upon experience, current budget, and projected needs (and costs) determined by management, with Director approval, as necessary to fulfill E.A.R.T.H.'s mission

-- revenues are projected (a) from anticipated tuition and related operating income, and (b) from other sources as required to cover the operating deficit. There is absolutely no expectation that E.A.R.T.H.'s operating income will totally cover school expenses. Rather, the operating deficit -- currently covered largely by A.I.D. grant funding -- is to be met over time by a combination of endowment income and grant/contract funding from sources other than A.I.D.

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[5] Relating viability to E.A.R.T.H.'s mission fulfillment highlights the importance of the dynamic growth issues reviewed in detail in the main body of this evaluation report.

-- revenues and expenses are projected to future years on the basis of 1989 constant dollars, increased by an annual inflation rate of 5%. This calculation properly references Colones to dollar equivalents on the assumption that the Colon-dollar relationship will reasonably reflect their respective value. The inflation rate is the estimate of the U.S. inflation rate.[6]

The revised 10-year revenue - expense projections developed by E.A.R.T.H. in consultation with the evaluation team are summarized in Figure 1 on the following page.

The projections in Figure 1 are based upon an endowment analysis set forth in Figure 2, on the page immediately following figure 2. The prime scenario presented assumes continued performance of the endowment based upon experience to date: annual return of 6.5% based on constant dollars, which with projected inflation rate of 5% yields real return of 1.5%. Figure 2 also projects a Scenario 2 with annual return of 7%, and a Scenario 3 with annual return of 7.5%. While returns at these levels are reasonably attainable, the evaluation team believes it adequate for purposes of this analysis to rely upon the more conservative estimate.

Figure 2 shows the projected 1999 endowment balances both in terms of constant 1989 dollars (adjusted at 5% inflation) and in terms of current dollars.

While the revenue/expense and endowment projections admit of a number of interpretations, the evaluation team considers the following points to be particularly significant:

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[6] The evaluation team concurs in this approach. The alternative would be the somewhat impossible one of predicting Costa Rica's inflation rate. It is more reasonable, for planning purposes, to rely upon Costa Rica maintenance of the Colon-dollar value.

Figure 1
(expressed in $000)
(constant 1989 $, increased by 5% annually)

	1990	1994	1997	1999
School Operations				
Expenses	2,043	6,752	8,114	9,218
Revs (tuition, etc.)	209	2,136	2,800	3,088
Op. Deficit:	(1,834)	(4,616)	(5,313)	(6,130)
Sources to Cover Deficit				
1. Prepaid exp.	(245)			
2. USAID Grants				
(a) US Dollar Grant	445			
(b) Coop Agreement	626	2,227		
(c) School funds:				
held by Trst	960			
held by School	46			
3. From E.A.R.T.H.:[7]				
(a) Non-A.I.D. Grants		[652]	[1,553]	[1,761]
(b) Farm	[254]	[714]	[764]	[1,063]
(c) Interest[8]	[24]		[110]	[-0-] [-0-]
(d) Total received	[279]	[1,477]	[2,318]	[2,824]
Total "expensed"[9]	-0-	2,388	2,318	2,824
4. From Endowment Income				
(a) Dollar endowment	-0-	-0-	1,801	2,061
(b) Colon endowment	-0-	-0-	1,192	1,244

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[7] Income recognized in year expensed

[8] Balance of $1,002,300 "other income" on hand 1/1/90. Interest earned at 6.5% average annual balance of "other income".

[9] Amount expensed in year may draw on earlier year receipts.

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<u>Figure 2</u>
($000)
(constant 1989$, increased by 5% annually)

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Endowment Year End Balances	1990	1994	1997	1999
Scenario 1:				
Constant $$	56,696	62,210	58,972	56,486
Current $$	59,531	79,237	87,131	92,010
(a) Dollar Endow:				
Constant $$	10,904	16,426	13,432	11,249
Current $$	11,450	20,966	19,847	18,324
(b) Colon Endow:				
Constant $$	45,791	45,655	45,376	45,235
Current $$	48,081	58,270	67,284	73,685
Scenario 2:				
Constant $$				59,262
Current $$				96,532
(a) Dollar Endow:				
Constant $$				11,924
Current $$				19,423
(b) Colon Endow:				
Constant $$				47,337
Current $$				77,109
Scenario 3:				
Constant $$				62,148
Current $$				101,232
(a) Dollar Endow:				
Constant $$				12,626
Current $$				20,567
(b) Colon Endow:				
Constant $$				49,520
Current $$				80,665

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APP-6-15

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--   In Figure 1, the key to E.A.R.T.H.'s ability to make up the operating deficit, given the limits on endowment revenues projected to be available over the decade, will be E.A.R.T.H.'s capacity to raise substantial grant and contract funds from sources other than A.I.D. For example, the projections assume non-A.I.D. fund-raising of some $650,000 by the year 1994 and almost three times that amount ($1.76 million) by 1999. (These figures are expressed in constant, not current dollars.) Fund raising at this level will require a high level of skill by E.A.R.T.H. staff, and strong support by the Directors, Trustee, and the U.S. "Amigos" group.

--   In Figure 2, under the more conservative Scenario 1, the overall endowment fund begins to decapitalize slightly after 1994 (and over the period when there is no further A.I.D. grant funding). While the 1999 endowment levels are substantial it would be desirable that the endowment not decapitalize. The projection in Scenario 1 does not suggest lack of viability, but it does identify the need for careful planning and adjustment at the time that the A.I.D. grant funding phases out.

III.   Recommendations

Based upon the findings and conclusions discussed above, the evaluation team offers several specific recommendations concerning E.A.R.T.H.'s future fund-raising capacity

1.   E.A.R.T.H.'s financial strategies should be closely integrated with its overall strategic planning. Specifically, E.A.R.T.H. should consciously seek

     (a)   to maintain a high quality of effectiveness in its operation in order
     (b)   to develop and maintain supportive relations with those national, regional, and international funding sources who particularly value the work of E.A.R.T.H.

2.   The fund-raising strategies and plans of E.A.R.T.H. management and staff must be consciously and closely integrated with the future fund-raising intentions and capacities of the Board, Trustees, and "Amigos."

GLOSSARY

ACTION RESEARCH Is a form of experiential learning involving more than one person collaborating together in a way through which they are able to share the way they learn about particular issues; research WITH people rather than ON them.

EXPERIENTIAL LEARNING Learning in which the learner is directly involved in the subject being investigated; where the outcome is the transformation of experience into knowledge.

PARADIGM Is the sum collection of beliefs and values and ways of knpwing that each of us brings to bear in ways which are characteristic of the manner by which we solve problems or learn about something new to our experiences.

PRAXIS Is the way we integrate our professional practices and the theories we use to inform those practices.

SYSTEMIC Is a particular way of approaching the world in which it is assumed that "parts" are always interrelated in some way so as to constitute "wholes" which themselves have particular characteristics unknown in the parts.